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ABSTRACT

This document includes 46 papers presented at the International Visual Literacy Association Conference on topics ranging from prehistoric cave paintings to technology of the future. Major sections are devoted to research and theory, education, computer technology, and phototherapy. Emphasis is on increased understanding of opportunities available for using visual literacy to equip people to deal more effectively with today's problems. Specific topics addressed include an analysis of visual recruitment materials used in higher education; picture legibility, readability, and reading value; visual literacy and cognitive style; assessing field dependency with theatrical slides; helping children to apply a conceptual model to photography; learning from television; mental imagery and participatory instructional design; the effect of visualization as an aid in teaching grammatical concepts in German; cameras in the curriculum; visual/spatial strategies for writing and reading improvement; a whole brain approach to creative problem solving; the potential of computerized multi-image production; creative visualization with microcomputers; visual technology and the development of active visual learning; and the creative elderly. (LMM)

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# ENHANCING HUMAN POTENTIAL

## READINGS FROM THE15th ANNUAL CONFERENCE of the INTERNATIONAL VISUAL LITERACY ASSOCIATION

Edited by

ALICE D. WALKER,
ROBERTS A. BRADEN and LENORA H. DUNKER

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- The Editors

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# ENHANCING HUMAN POTENTIAL THROUGH VISUAL LITERACY

Most organizations possess a potential for growth. That the International Visual Literacy Association has grown in size and stature over the years is evidenced by the caliber of participation in the 15th annual conference held in Bloomington, Indiana. That IVLA must continue to enhance its development is also clear. Beginning with the keynote speech by Roger Wescott, members were challenged to open their eyes and stretch their minds, to broaden their vision, and to look into the future.

In a second speech, delivered at the leadership recognition luncheon, IVLA's founding father, John Debes, emphasized the power of literacies by tracing the historical development of verbal and visual languaging. Both Wescott and Debes increased our understanding of the opportunities for employing visual literacy to equip people to deal more effectively with today's problems.

Individual sessions were varied and vibrant. Newhouse and Kellstrom led a fascinating excursion into the mysteries of the past with their slide-tape program of prehistoric cave paintings. Becker brought us back to the present with his poignant description of a young artist who has traveled from the dark caves of near blindness into a world of light, and Mortier lifted us to new levels of vision in the evolution of perceptual awareness.

Practical applications of visual literacy are emphasized in the two concluding papers in this section. Miller looks at a gestalt of communication literacies and finds the ordinary telephone directory a superb source for developing the literacy skills of non-native speaking students. Before taking her advice to "reach out and touch someone," however, be sure to read Mills' treatise on interpersonal relations. You will gain new insights into the hierarchy of human encounters of the meaningful kind.

Philosophy, art, research, education, technology, psychotherapy--from the prehistoric past to the phantasmagoric future--all this and more await you in the pages of the Readings from the 1983 International Visual Literacy Association conference.

# OPENING OUR EYES AND STRETCHING OUR MINDS

by
**ROGER W. WESCOTT**
Drew University
Madison, New Jersey

Those of you who are my age may recall the first line of a popular college song ran, "A man without a woman is like a ship without a sail." And, noting my lack of films or slides, you may be thinking to yourself that "a visualist without visuals is like a speaker without a speech."

On this occasion, however, I am going to ask you to join me in exercising not the body's eye but the mind's eye. Neurophysiologists agree that, of all sensory organs, the eyes are at once closest to the brain and most richly innervated with communicative links to the brain. They likewise agree that, of all bodily organs, the brain has most to do with that crucial but elusive entity known as "the mind."

Not all neurophysiologists, of course, merely equate the mind with the brain. Many treat the mind as an activity of the brain, bearing the same relation to it that walking does to the legs. Some regard it as the content of the brain, which stands to the mind as a house to its occupant. A few, finally--with whom I tend to agree--view the brain as a tuning mechanism, which does for thought what a radio does for music.

What this tuning metaphor suggests is that the brain, rather than containing the mind, may be contained by it, as, in fact, the entire body may also be. And evidence to support this postulated relationship comes from several sources. One of these sources is the late British intellectual explorer Aldous Huxley, who saw all creative thought as drawing, by means yet unclear, on what he called "mind at large." Another is the American anthropologist Edward Hall, who created what he terms proxemics--the study of the communicative meaning of interpersonal spacing. Hall found that most of the world's peoples experience their bodies as surrounded by an invisible space-bubble, intrusion on which is felt to be a violation of their self-hood. A third is the psychiatrist and theologian Raymond Moody, who made an intensive (and ultimately cross-cultural) study of near-death life-crises, nearly all of which included "out of the body" experiences. In the course of these experiences, people lying in apparent comas on operating tables or at the scenes of accidents felt themselves floating over their bodies and observing all the frantic resuscitative activities occurring around their bodies. The verbal portions of these activities were subsequently reported in detail by the supposedly comatose individuals involved.

What these various experiences suggest is not only the inseparability of sight from insight (as indicated by the literal and figurative meanings, respectively, of the phrase "I see") but also the inseparability of visual from non-visual perception. For human beings, as for most other primates, seeing and hearing are so closely linked as virtually to constitute a single audio-visual capacity. In his sonnets, Shakespeare asserted that "To hear with eyes belongs to love's fine wit." And improvisatory jazz performers sometimes report that they can actually see their music dancing in mid-air--at which point sensory linkage gives way to sensory fusion, yielding what perceptual psychologists call synesthesia.

A weaker, but commoner, form of synesthesia is purely verbal in nature, as when we employ expressions like "a bright boy" or "a loud shirt." Normally, boys don't luminesce and shirts don't yell. Yet, to the mind's eye and the mind's ear, they may do both.

In this connection, historical linguists observe that there is a marked regularity to the development of sensory metaphors. When words referring to perception or thought shift reference, they do not do so in a random or unpredictable manner. Instead, they nearly always follow a progression from non-visual to visual (as in the case of the verb behold, which originally meant "grasp with the fingers") or from concrete to abstract (as in the case of the adjective wise, which originally meant "seeing" and is cognate with the Latin-derived term visionary).

Compared to most animals, human beings, though smell blind, are richly sighted. Yet we are far from being the sole occupants of a pinnacle of visual acuity. There are several other species, all of them, significantly, groups of winged animals, that surpass us visually. Hawks, for example, (who, being able to dive at 200 miles an hour, are the swiftest creatures known), can see eight times as far as we can. Owls can see infra-red radiation, the color of very faint heat, and make use of it to hunt at night. Honey-bees, finally, can see ultra-violet light and polarized light, both of which are invisible to us. Ultra-violet light makes flowers that seem drab and colorless to us look bright and attractive to bees, inviting them to seek out floral pollen and nectar. And polarized light enables bees, even when a mile or more from their hive, to engage in accurate solar navigation despite cloudy or overcast skies.

Comparisons of the vision of our species with that of other species may seem to imply that human beings are mutually indistinguishable in visual sensitivity. Needless to say, this is not so. Just as there are, on the one hand, congenitally blind individuals who see nothing, so there are, on the other hand, exceptionally perceptive individuals who see what normal human beings cannot see. One such group consists of hypereidetes, or "eagle-eyed" people, who have better than 20/20 vision. It is said that at least one of our American astronauts was gifted this way. Another such group consists of people with "photographic memory," who can reproduce most of a printed page after only a brief glimpse of it. (The most plausible explanation of this phenomenon is that it is not really memory at all but a detailed and persistent after-image.) A third such group consists of photodermatics, or people endowed with dermo-optical perception--the ability to see through their skin. Photodermatic perception is apparently not evenly distributed throughout the body surface but focused, either in the skin of the face or hands, especially the forehead and the finger-tips. A fourth such group consists of aura-visionaries, or people who, under favorable conditions (such as relative immobility in dim light), see rings of polychromatic light around other individuals. In some cases, aura-visionaries claim to be able to determine the state of health or even the mood of others by the appearance of their auras, positive auras being thick, bright, and spikey, while negative auras are thin, dull, and droopy.

There are, predictably, strong differences of opinion concerning the reality of exceptional visual gifts. Although only a few scholars now challenge the reality of hypereidesis and photographic memory (both of which can be objectively tested), most remain sceptical of photo-dermatism and aura-vision, suspecting that the former involves trickery and the latter an over-active imagination. If reserved judgment is warranted in these cases, it is probably even more justified in cases of clairvoyance and precognition--the ability, claimed by a few psychics, to picture with clarity and in some detail what is distant in space or time. Our ancestors, of course, were less suspicious about such special visionary abilities. In a more credulous--or perhaps we should say, putting it more positively, a more fideistic--age, visionaries as a group were referred to, quite simply, as seers.

Compared to some birds, insects, and human visionaries, then, we average human beings appear to be at least partially blind. By the standards of the ancients (which are still shared by most contemporary preliterates), most of us would also be judged as perceptually handicapped with regard to the spiritual or supernatural world. Where our ancestors often saw apparitions of their patron deities or heard admonitions from their guardian spirits, we usually see and hear nothing beyond the flicker of television and the din of traffic. To them, we would have seemed god-blind. (To us, by the same token, they would seem hallucination-prone.)

To the extent, however, that vision is a conceptual rather than a perceptual capacity, most of us are not so much blind as we are short-sighted and lazy-eyed. Our short-sightedness is perhaps most dramatically manifested in the tendency of our businessmen to focus their planning exclusively on the next quarter and their anticipation solely on the next year's profits. According to that new breed of interdisciplinarians known as futurists, it is our lack of long-range vision that is leading us almost inevitably into economic decline and ecological crisis.

In the field of ophthalmic medicine, lazy-eyedness is referred to as amblyopia. An amplyope is an individual--usually a child--who has one active eye, which tracks the visual field energetically and accurately. His other, however, is "lazy": it moves little and fails to provide his "good" eye with the triangulation needed to yield full depth perception. (Oculists usually treat amblyopia by temporarily covering the active eye and thereby compelling the lazy eye to become more active.

Conceptual amblyopia consists of a too great readiness to accept the conventional view on any subject of concern. One way to define culture--the life-way that distinguishes us from other animals--is to call it mutual hypnosis. To the extent that such hypnosis directs each of us to see things which he might not see on his own, it is clearly advantageous. To the extent, however, that this hypnosis prevents each of us from seeing what he might otherwise see (such as "the emperor's nakedness"), it is a handicap.

Here, as elsewhere, there is a significant correspondence between the anatomy of perception on the one hand and behavior-determining concepts on the other. The organ which makes human visual activity greater than that of most other animals is the fovea, a small pit, or concavity, at the back of the retina. We pay, however, for this gain in the sharpness of our central vision with a loss in the sensitivity of our peripheral vision: we sense lateral movement less readily and less clearly than do dogs, horses, and other mammals. In effect, we have well-focused tunnel-vision, both literally and figuratively speaking.

To broaden our vision on any subject, we need to see beyond the consensus in that subject. Consensus, of course, is a double-edge sword. It cuts out scattered effort by increasing collaboration. But it does so at the price of decreasing innovation. And there are too many areas of contemporary endeavor in which useful breakthroughs are blocked by excessive consensualism.

One area in which consensualism seems to me to have both stifled debate and delayed insight is that of the relation between myth and science. Until the 19th century, myth and science, though clearly different, were complementary: they did not contradict each other as regards such basic matters as how the world we know came to be as it is. But scholars like Hutton, Lyell, and Darwin created an evolutionary consensus known as uniformitarianism, in accordance with which all planetary changes are to be interpreted as having taken place gradually and imperceptibly over a period of eons. This view of earth-history clearly contravened the mythological view (including the pictures of the past provided by such religious scriptures as the Old Testament), in accordance with which there have been world-wide cataclysms, such as the Great Flood, within the memory of man. The mythological view, known as catastrophism, had been accepted by scientists as well as theologians until the 1830's. Thereafter, however, science seemed to be at odds with both pagan myth and Biblical religion.

In fact, we have no firm dates for any past events prior to the time of the Persian and Macedonian empires. All prior chronologies are based either on the nationalistically inflated histories of the Egyptians and Babylorinans or on recent stratigraphies and radiometries that were themselves predicated on the assumption of immemorial gradualism. Uniformitarians opine that our ancestors and our preliterate contemporaries fantasized both the Golden Age (known biblically as Eden) and the series of disasters that are said to have terminated it. I, however, find it easier to believe that mythology is the vivid after-image of an archaic reality and that uniformitarians have repressed the abundant evidence of prehistoric disasters because that evidence is distressingly suggestive of future disasters beyond our control.

In any case, it is undeniable that the traditional mythic view and the dominant scientific view of man and his past now lack mutual congruence. To the extent that they are both religious and science-minded, most moderns have consequently become intellectually wall-eyed. To my mind, the only way to restore mutual congruence to these two ways of seeing is to accept secular catastrophism, or saltational evolutionism--the view, that is, that our collective past, both human and pre-human, has been marked by intermittently abrupt discontinuities. In this way, we can profit equally from the precision of science and technology and from the richness of mythology and religion, without having either to discount one of them or so to compartmentalize them that they never really touch each other.

Earlier we referred to futurists and their insistence that the only effective form of economic planning is long-range planning. Futurists are equally concerned with medicine and every other sphere of human endeavor. No matter what endeavor they address themselves to, however, they are convinced that we tend to get the kind of future we invite--whether by deliberate planning or by non-verbal visualization. In the area of human health, most of our current activity can be described as either remedial medicine or preventive medicine. Remedial medicine is devoted to the treatment of existent illness and preventive medicine to the forestalling of expected illness. Both endeavors, however, are oriented toward illness rather than toward health and are, in this sense, negative.

Speaking as a futurist, I would like to propose instead that we adopt an explicitly positive approach to health matters. This approach I call promotive medicine--that is, medicine which is oriented toward the definition, creation, and enhancement of health. Implicitly, at least, health-promotion seems to me to have been the position adopted by author Norman Cousins, when, having been told by his physicians that he was incurably ill, he left the hospital, devoting himself to laughter and to the evocation of vivid images of the kind of health he wished to enjoy. He recovered glowingly and now teaches courses on health in a medical school whose curriculum is otherwise depressingly confined to courses on pathology.

Our wheel having come full circle, we may now return to the topic announced in the title of this talk. To picture ourselves as waking and preparing for a new day is to envision an end to perceptual and conceptual immobilization. A visualist is, almost by definition, committed to the search for new vistas. The goal of this search can hardly be better expressed than it was by the aged Goethe, who, moments before his death, called ringingly for "More light !"

# READING OR NOT, I AM COMING

by

**JOHN L. DEBES**

Macedon, New York

Good afternoon. Marvelous conference up to now, right?

I wish that there were some good way in which I could really endow you with the context in which I am experiencing this meeting. Fifteen and a half years ago, at the First National Conference on Visual Literacy, I made the keynote speech to a group of people which had no organization, no goals, no awards, no rationale . . . only a lot of questions and a clutch of ideas in common . . . questions and ideas generated by observing the change in the children that were entering our schools. Today, I look again from the lectern but I see people who have bound themselves together in an organization that has survived when many other organizations founded about the same time have already died; at people who have gradually shaped a set of goals that are vital to education and society, people who have already made some considerable changes in books, in teaching, in theory, and people who are leaders and will obviously accomplish more as they continue to work together.

In that context, I feel honored to have been asked to speak to you at this special luncheon for the recognition of your leadership . . . but I will now personally salute you all for what you have done, and for what I confidently expect you will accomplish. In my eyes, you are all leaders.

Did you ever play Hide-and-Seek when you were a kid? If so, you probably did as I did when you were IT. That called for leaning your head against a tree trunk and counting out loud while the other kids ran to hide. When you were through counting, you called out, "ready or not, I am coming!" Then, whether you were tall or short, strong or weak, quick or slow, game-wise or inexperienced, you dashed out into the dark to catch as many other kids as you could.

I don't know how the game was played when you played it, but when I played it whoever was IT . . . did not make any effort to find out whether the kids hiding were "ready." The person who was IT decided . . . in effect he said, "Whether You are ready for Me or not, here I come!"

That game is my metaphor for today's child coming into our schools, and today's young adult coming into today's world. We are not really "ready" for them; they are not really "ready" for us.

These remarks will also concern the George Orwell novel, 1984. To an appreciable extent, that novel is about literacy . . . about the control and shaping of literacy and the kinds of thinking that real literacy makes possible. Orwell saw literacy as something that could be controlled. I am going to suggest to you that Orwell misperceived the nature and power of literacy and that you and I also have been guilty of misperceiving the nature and power of literacy. I believe that our troubles in achieving what we would like to achieve in our research and in our schools have plagued us largely because of our misperceptions of literacies in general . . . in particular the literacies with which our young people are armed when they enter school.

I was brought around sharply to this point of view by a recent re-reading of Alexis De Tocqueville's book Democracy in America. I was struck by De T.'s observations about the intellectual leveling and the rising of status that is transforming the world, and transforming it to an appreciable extent through literacy. I'd like to remind you of what De T. said:

> . . . a great democratic revolution is taking place in our midst . . . the gradual progress of equality is something fated. It is universal and it is permanent and every event and every man (sometimes despite himself) helps it along. All over the world conditions are nearer equality today than they ever were before. It is an irresistible change advancing century by century over every obstacle and is even now going forward.

What struck me was that although De T. came to this conclusion in 1830, we are, today, seeing that same revolution continuing and continuing at an accelerated pace.

During this talk, I want to be visual with you, but visual in a special way. I'd like to have you each take one of those pieces of paper that are on your tables and make use of them in ways that I will describe, but ways that you will decide. If you do not have a pen or pencil, you will find pencils on the table, also. Now, if you will follow my suggestions, you will be drawing visuals in the frames outlined on your page. Would you, please, choose one of the frames at the bottom of the page that you will regard as your first one, and fill in the frame with something visual that says to you what I have been talking about. For instance, you might draw a fulcrum with its base down and its point up, and a teeter-totter plank across it. On one end of the plank you might put some symbol for power in the hands of the few, and on the other end your symbol for everybody . . . for the mass of mankind. Your purpose will be to visualize for yourself alone my first point which is that as time goes on a greater and greater percentage of the people will be sharing in and participating in the decisions and the fruits of our civilization . . . and that the change is occurring and will occur to an appreciable extent through the powers of literacies.

If you have doubts about this, it is natural, natural because in attempting to extrapolate from De T. to today, our perceptions of literacy are fettered. We are fettered by the only literacy, the rather strictly verbal literacy we happen to have, and by our ego-massaging pride in and over evaluation of that literacy. We are so involved with the primary literacy we do have and what we have been told about the importance of that literacy that we are hardly able to see the vast civilization changing advances in the kinds and powers of new literacies that are welling up in our time.

If you would like to utilize the next frame on your visualization sheet you might make this point by sketching in a person with a chain around his leg and a huge book at the end of the chain. You can probably do much better than that. What I mean to say is that we are blind to the new literacies because they are not obviously like the old. We have difficulty either recognizing them or valuing them, let alone really studying them or understanding them.

It is a mark of our era that almost yearly . . . almost every year . . . we are given the opportunity to welcome or celebrate the birth of some new kind of communication media. But, we fail to observe and reckon with the fact that every time a new kind of media begins to spread in our society, a new kind of languaging behavior begins to develop and a new kind of "reading" begins to be required. New kind of languaging . . . yes! Let's take a relatively recent one. Many of you are aware of Bliss Symbolics. Sixteen or so years ago, it could properly have been said that there was no such thing as a population literate in Bliss. No group of people existed for whom literacy in Bliss was exigent. Today, there are thousands of such young people in Canada and the U. S. Ten years or so ago, computer languaging was mostly conducted with arcane codes with special prefatory genuflections; the skills were important to only a few specialists. What is emerging now are languaging systems that are being adjusted to having the common man use them daily for all the businesses and foolishness that the common man may yet conceive. What is now certain is that millions of people will eventually begin languaging in these new ways of becoming informed and of communicating, that new kinds of reading skills will be required, new writing proficiencies expected, and so another wave of literacy will be shaping man and being shaped by man.

If you wish to visualize this group of ideas, you might use the next frame on your page by drawing the Bliss symbol for man. That is an upside down Vee for a pair of legs, and a short straight line from the tip of the Vee upward for a torso. After that symbol, on the same line, you might draw a heart, and after that a woman . . . which you make by drawing the man again but putting a skirt on him by drawing another line between the bottoms of the legs of the Vee. There, now you can be regarded as having said, "Man loves woman" or vice-versa in Bliss and you yourself are on the way to a new literacy.

With each new media that comes along, we begin to make use of it, just as we did TV. Through that use, we begin naturally to acquire a poor fumbling kind of literacy. In languaging of a brand new sort, each person in effect invents his own wheel. So, despite being able to stumble along, each of us remains appreciably il-literate. Unpleasant for us and ominous for society is the fact that the more complicated the medium, and the more subtle, the more the great mass of the public, being only self-taught and only somewhat literate . . . is likely to become the victim, the unwitting tool of those who are expert, truly literate users.

Victims? Yes, indeed! In these times, political people and advertising professionals who are more skilled in a new kind of languaging regularly demonstrate the power they have over those less literate. The silver-tongued orator of 100 years ago has become the gold-plated father-image who can say almost anything in words as long as his body-languaging is reassuring. (At this point, you may wish to put a visual of your own conceiving in the next frame. I used a child crushed by a TV set).

If history is a reliable guide, and my re-reading of De T. assures me that it is, the only way for the great masses of people, the common man, the body of society to become really literate . . . so that they are not victims . . . is through education as children. As the kinds of media increase, and more literacies become necessary, much more and different education becomes necessary. The more media there are, the more necessary to a democracy properly prepared teachers and appropriate curriculum become.

It was George Orwell's perception of this that lay behind 1984. He projected ways in which verbal literacy abused could become the central means for attaining and shaping political power. That novel speaks strongly to us urging that we are ourselves through education with the literacy exigent to democracy.

Here is a quotation from 1984:

> . . . to the extent that leisure and security are enjoyed by all, the great mass of human beings who are normally stupefied by poverty may become literate and once they accomplish this will realize that the ruling privileged minority has no function and will sweep it away.

In other words, Orwell in 1984 saw literacy as the chief threat to the power of the ruling group.

Is anything like this going on in the world today? Yes, Orwell was prophetic. Not too many years ago, Brazil decided that to compete with the rest of the industrialized and educated world, Brazil needed to have one million peasants learn to read. To do this they obtained the services of the now famous educator, Paolo Freire. Paolo Freire succeeded handsomely . . . so well, in fact, that his literate peasants began to challenge the ruling group in Brazil. As a result, the threatened government exiled Freire.

What the Brazilian governing group wanted was a bare, Yes-I-can-read-and-write, kind of literacy that can be used for instruction books or military manuals; they did not want the kind of literacy that goes beyond that to thinking about meanings or analyzing consequences.

Real literacy, not the bare, thin imitation, involves first, obtaining information through relatively simple use of languaging in a particular media type; second, a more skilled analyzing or thinking about both the information and the form and purposes of the communication; and third, considering the consequences of the communication for self, for situation, or for society. This kind of literacy is developed only through education which for the visual media must begin in the early years.

Frightened by the threat of the literacy they had created, the Brazilian government then tried to control it by censorship, by preventing facts from reaching the people. The same kind of thing happened in Russia recently when the Korean plane was shot down by the Russian military; all news was interdicted for the first few days. After that, only a few facts but many official interpretations were carefully fed to the Russian people.

If you wish to use another frame to visualize this point, you might use the man with the book chained to his leg further hampered by having another man tugging on the book.

There are, unfortunately, some manifestations of this fear of literacy right here in the good old U. S. of A. President Reagan in some recent moves by his administration is insisting that all federal employees be required to sign a contract . . . a life-long binding contract . . . that they will not talk, or write, or give interviews about anything that they know about what is being done by our government _without first obtaining the permission of the administration in office_. In other words, a person who works for us in our government, and whom we pay with our taxes, may not tell us anything at all about what he or she knows without permission of the administration in power. Obviously the Reagan administration regards the literacy of our citizens as a threat to their power. The exclusion of the press from the Grenada invasion, and the reluctance to hold press conferences is further evidence that the Russian or Brazilian frame of mind is restricting democracy right here at home.

Whom can people in power blame for this threat? Educators, that's whom! Educators and anyone else who teaches literacy of any kind.

YOU PROBABLY HAD'NT THOUGHT OF YOURSELF AS A REVOLUTIONARY, HAD YOU? But in the De T. sense, and in the threat-to-power sense, you are, whether you are teaching people to read and write, verbally or visually, or to use the tools of literacy to research, to reason, to analyze, or to create. Unfortunately, mind sets hostile to or ambivalent about literacy are found among other people than those in political power. We ourselves . . . I mean you and I . . . are often also guilty. If the medium is a new one; if the literacy is of a new kind, if the literacy does not measure up to our prejudices about what literacy ought to be, we may disdain, ignore, or otherwise attempt to stifle it.

Looking at ourselves, I see us as a society that is fettered by a simplistic, outdated, people-limiting, society-crippling set of conceptions about literacy. By the term "literacy" we mean a verbal, written-English-language kind of thing that was esteemed in the past. It was blessed by our parents when we were going to school, and we were rewarded by our teachers when we aped theirs particularly well. What we have is an ego-enhancing possession that is threatened when we meet anything else. So, we tend to denigrate whatever other kinds of literacy we may observe in the behavior of our students, colleagues, or fellow citizens. Any change in what is officially or formally called literacy will become a threat to us if it seems to value media-using skills that we do not happen to have. The visual literacies are especially subject to such denigration. They are ignored or circumvented by some of us in this very room . . . and this I am sorry to say includes me. I catch myself at it more often than I care to admit.

One way of getting to understand how important all this is may be to take a look at the history of the literacy we think we know well . . . verbal, printed-word literacy.

The invention of printing technologies in Europe by Gutenberg set off the verbal literacy revolution that began to transform us. At the time of Gutenberg, that is about 1550, very few people outside of the clergy, scholars, and lawyers knew how to read. One estimate says that less than one out of 100 was literate. Why bother? Books were few and anything else to read was very rare.

By the end of the first 100 years after Gutenberg, books were still rare, but the Bible and religious tracts were in print and beginning to stir people up. Most people never got their hands on anything in print, however, so although printed materials were somewhat more common, literacy did not rise much in numbers. One estimate guesses that 5 in 100 could read.

In another hundred years, however, the change was more dramatic. By 1750 printing presses and the art of using them were beginning to find their way into the hands of the common man. Books were rather commonly owned by the wealthy (You may all remember how Benjamin Franklin won favorable regard of wealthy men by borrowing their books). But the big factor was that schools were teaching reading and writing to those fortunate enough to go. The American Colonies outstripped Europe in this, because schools for every citizen were among the high priorities of the colonists. So, by 1750 in the U. S., an estimated 15 out of 100 were "literate."

Before we discuss the next wave of changes, would you please use the large frame at the top of your visuals page in which to make a graph. You might put a row of numbers across the bottom beginning at the extreme left margin with the year 1600. At the extreme right margin, please put the year 2000. That means that you can make a small mark in the middle of the bottom line for the year 1800 so it will then be easier for you to divide the rest of the line into 50 year increments. On the vertical line on the left, please write zero percent at the top.

Now, over about the year 1650, put a dot at about the level of 5; over about the 1750, place a dot at about 15. Now, we are ready.

Between 1750 and 1850 technology had laid the basis for an enormous change. De T. tells about how in the 1830's he observed an incredible profusion of throw-away kinds of printed materials. Everybody seemed to have them. He believed that it was because printing presses were almost common, because distribution within communities was easy and cheap, and by mail-service becoming less expensive, and most importantly because children in all settled communities were likely to be attending school regularly. The jump in literacy in the United States was from about 15 in 100 in 1750 to about 60 in 100 in 1850. So, going back to your graph, over about the year 1850, put a dot about at 60. But, having done that notice again what de T. noticed . . . the incredible profusion of throw-away materials . . . advertising, political flyers, polemics, directions for doing things . . . all temporary kinds of materials which the common man could readily perceive it was to his advantage to read.

The next 100 years brought a big change, too. In 1860 the typewriter was invented by three guys from Milwaukee. Only ten years after that, the first school for teaching typing opened in New York City. And, only ten years after that, systems for duplicating were being produced and sold. At last . . . AT LAST . . . the entire means for printing, duplicating, and distribution were becoming the resource of the common man. So, thus beguiled and provoked, everybody climbed on the band wagon. By 1950, 96% could read and write in the United States and by 1980, it was 99%.

Now, before looking at visual literacy, let's study the development of verbal literacy against the factors that nourished it. Please put some marks next to the dots you made on your graph. Next to 1659, indicate somehow that there were few or no books available to the common man. Next to the 1750's dot note that there were some books and newspapers. Next to the 1850's dot, show that books, magazines, newspapers, and promotional materials were common. And, finally, next to the dot for 1950 indicate that the means for writing, printing, duplicating, and distributing were available to almost everybody, and dissemination a cinch through the United States Post Office.

In that context, let's look at what has been happening to Visual Literacy. I suggest that you place your first mark on the graph for visual literacy at about the year 1950. Before that year, although comic strips and movies provided some experience with visual languaging, the technology for reading and for producing was in the hands of a very few professionals (even 8mm home movie equipment was still comparatively expensive). Though we might quibble about it, my estimate is that there were only about two people in 100 who could be called visually literate. So, put a dot over about 1950 at the level of 2 and note that compares to about 1650 on the verbal curve.

We should also note in our minds that 1950 was about two years before the wave of home TV ownership hit the U. S. family. Between 1950 and 1970 TV became part of the reading material in 99% of U. S. homes . .. that is part of the daily life of every man, woman, and child. I said CHILD because if we look for an analogous time in the development of verbal literacy we must look for the time when printing technology and delivery systems could put cheap, throw-away materials capable of commanding the attention of children in the home of every American child. For verbal literacy that would have been somewhere between 1900 and 1920.

Now, if the analogy you are creating on your graph is valid, we might expect that between 1950 and 1970 when TV became available to our children a moderate rise in visual literacy would occur. And indeed that is so. By 1970, I believe it increased from about 2 in 100 to about 8 in 100. So, if you wish, place a dot at about the level of 8 over the year 1970.

By 1970, however, 8mm movie cameras and film had begun to appear in U. S. high schools and colleges, so the moving image, the essence of visual languaging, was beginning to be available to the young for writing visually. Between 1970 and 1980 video equipment dropped dramatically in size and price, and systems for storing and displaying video forms of visual languaging were numerous and getting to be more so. Books using visual sequences were decidedly more common. College courses in comics and the rhetoric of comic sequences were to spring up on campuses east and west. Furthermore, the great mass of children in the U. S. were coming to school with enough exposure to visual languaging to provide a fine base for developing visual literacy.

Given these more favorable circumstances, we might expect that a sharp increase in visual literacy would have occurred. But, the percentage increased only from about 8 in 100 to about 10 or 12 in 100. What went wrong? What was missing?

What I believe is missing is the element De T. judged so important . . . and that we might deduce from the graph we have made of the development of verbal literacy . . . our schools, our elementary schools, are not teaching visual literacy. If, in the development of verbal literacy, the teaching of it had waited until children had reached adulthood, we would probably not be really verbally literate as a nation even yet. English would be being taught as a second language to adults. Teachers who did not learn to read and write themselves until they were adults would be trying to become really literate without having had the chance to do so during the years when language learning is most facile. Furthermore, from research, we already know that the capacity for vividly holding visual imagery in mind is at a peak for most people between the ages of 4 to 14; that is when it is most urgent that visual languaging and visual literacy be taught.

As I see the situation nationally, the circumstances are now right for us to begin to bring a whole nation up to visual literacy as well as verbal, but there are a number of impediments.

First: (and most important) Teachers' colleges are not training teachers to be visually literate themselves and to teach visual literacy.

Second: Because schools are not teaching visual literacy, students are moving through their peak time for language learning having been taught to value only verbal literacy. They then go out of school and become parents who, because they only value verbal literacy, pressure school boards and other educators to increase emphasis on "Back to Basics." Thus we create a vicious circle, in which the lack of the literacy we fail to nurture comes back to prevent our doing it.

Third: Equipment for visual literacy . . . movies. video, interactive TV, visual computer image interfaces, and interlibrary access all need to be to some degree in every kind of classroom so that all students can regularly compose school work using visual languaging, as well as verbal.

Fourth: Curricula in all subjects, but beginning with languaging in the earliest grades and continuing through high school, need to be revised. Semantics, rhetoric, and logic in several languaging forms needs to be part of the intellectual armament of every adult.

Fifth: Because young people are finishing school and going on to college without becoming visually literate, those inclined to go into research . . . even if they do it in visual literacy . . . can only ask questions and conceive of research strategies that are based on the verbal models. Research in linguistics, anthropology, psychology, and sociology needs seminars on the use of the visual languaging window for understanding those fields, and from the rewards of such efforts laying the basis for the superior teaching rationales and techniques so badly needed in the schools.

Meanwhile, while we do relatively little about these problems, I. Q. continues to go up; meanwhile, the levels of information with which our young equip themselves through the media continue to rise. IVLA pioneer Mike Lasser once said, "This is the best informed and least wise generation we have ever had in the schools!" Least wise? Whose fault is that?

It is our fault. WE are permitting today's children to remain illiterate in the very form of languaging that is the source of most of their information about the world. WE in education and the psycho-research sciences have the responsibility.

And among educators and scientists, it is YOU, you in IVLA, this group, you in this audience, who are among those most likely to be able to see the urgency of all this and to do something about it, personally. You . . . whether you believe it or not . . . are the truly revolutionary group in the De T. sense of that role. You have the power to release minds with the new tools. You have the potential to equip people to deal more effectively with political, economic, and research questions. You are the folks upon whom the future of American educations most particularly must depend.

Facing you and me . . . facing us especially . . . are generations of children armed to become literate in all the old ways and in the new and more powerful ways as well. They have no choice but to depend on us. So, whether we like it or not . . . whether we feel ready or not . . . whether they are ready or not . . . they are shouting at us, READING OR NOT, WE ARE COMING.

What are you going to do about it?

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# CAVE PSYCHOLOGY: VISUAL EDUCATION

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This presentation deals with the oldest known art. . .art 30,000 years old. If one were to compile a list of wonders for the prehistoric world, on the model of the seven wonders of the ancient world, it would have to include Paleolithic art. Any art from a period so remote would be of interest, but the attraction that Paleolithic art exerts upon the public is probably a reflection of both its quality and its enhancement of human potential.

After 1940, when the large, colorful paintings found in the Lascaux Cave in France were publicized, people finally became convinced that our early ancestors were far more than simple savages. Their art told us what these people were like. On the walls and ceilings of caves, in clay figurines and in decorated artifacts, these people exhibited an unprecedented artistic mastery which still ranks among the world's greatest.

The birth of art has its obvious connections with the prior existence of tool making. It was not until the beginning of the upper Paleolithic period (approximately 10-35,000 B.C.) that the first signs of man's artistic endeavors appeared. The following chart (Figure 1) shows the various cultures of the upper Paleolithic period.

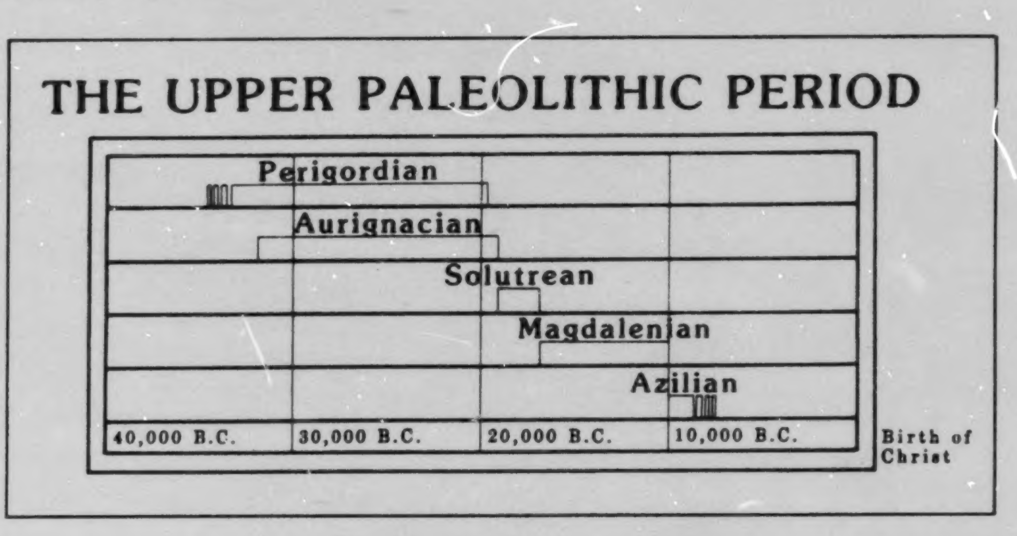

Figure 1. Cultures of the upper paleolithic period.

Industry is the archaeological term given to a group of stone and bone implements of recognizable type that are consistently found together. We depend almost entirely upon the recognition and frequency of such artifacts when trying to group people at a stage in history. Differences in tool types have been made the basis for separating people culturally.

The order of individual cultures often overlap. The Aurignacian, Soutrean, and Magdalenian cultures are in the upper Paleolithic period. Many of the deep caves have a long history, showing decoration from Aurignacian to Magdalenian. The people of these cultures are referred to as Cro-Magnon people. The Magdalenian culture which falls in the late upper Paleolithic period, about 16,000 B.C., appears to be the culmination of Cro-Magnon technology and artistic talent.

We know that the Cro-Magnon people lived in Europe between 30,000-8,000 B.C., lived a nomadic or semi-nomadic life, and were specialized hunters and food gatherers. Their implements were made of stone, antler, bone, ivory, and wood and they had the use of fire. They developed an effective invention called the spear thrower which permitted them to hunt reindeer from a safe distance. They even developed a method for determining the phases of the moon for hunting seasons. They also devised scrapers, cutters, and sewing needles that allowed them to make comfortable clothing, jewelry, snug shelters, and many other necessities and luxuries. They invented the first crude forms of baked pottery, constructing kilns, and even burning coal. They were the first to weave baskets. They developed the practice of plant-gathering to the point that was just one step away from farming.

Prehistoric hunters and their developments have been carefully researched in many countries, but it is in France that these studies have been carried to a high level of refinement.

Most of the art depicted in this paper came from the sites shown on the following map. (Figure 2) Three regions are often mentioned as receiving prominence as Paleolithic art centers. The first of these centers is the southwest region of France (the Dordogne Region), the heaviest concentration (69 sites) within a 20 mile radius of the village of Les Eyzies. The second is the Pyrenean Region of Southern France, and the third is in the Cantabrian area of Northern Spain.

The Vezere River in the Dordogne Region of Southwest France twists 119 miles across a limestone plateau before joining the Dordogne River, which gives the surrounding region its name. The steep cliffs of limestone became pitted and honeycombed by water and frost, forming hundreds of protected sites suitable for human habitation. Further south in the Pyrenees, similar rocks made cave formations possible. The rock overhangs provided shelter and became a population center for the Cro-Magnon people. The food supply was plentiful due to immense reindeer herds migrating in the spring, and the rivers of the area were filled with salmon during historic times.

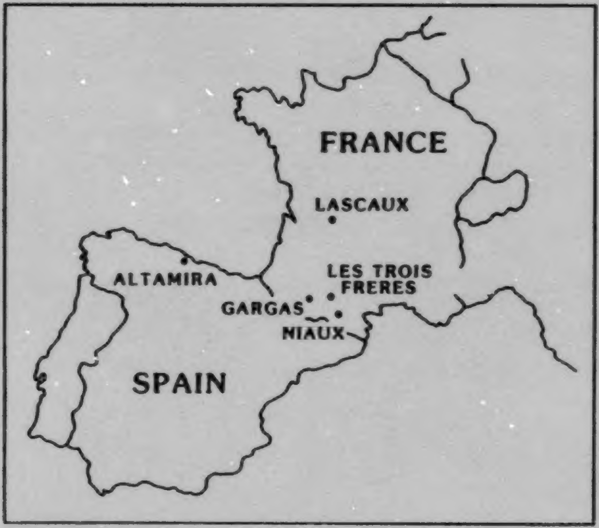

Figure 2. Map depicting paleolithic art centers.

About 200 cave sites with painting have been discovered to date. Ninety percent are located in France and Spain. The location of only a few major sites are described below.

The five centers are:

Lascaux is probably the most famous of all Paleolithic caves. Its paintings are in the greatest state of preservation, which makes it unique. It is located near the Dordogne district and was found by chance during World War II. It was opened to the public in the late 1940's and closed shortly after because the temperature and humidity changes, caused by the great number of visitors, threatened to ruin it.

Altamira was the first cave discovered that was documented and the first cave to be recognized as Prehistoric. Altamira is considered to be one of the most beautiful cave centers.

Gargas is known for the numerous skeletons of cave bears found there. A particular feature of this art center is the wealth of stencilled human hands located on the walls.

Niaux is a gigantic cave located in the foothills of the French Pyrenees. The animals are so realistically and beautifully painted on the walls that one feels that the artist must have used live models. A rare feature is the engraving cut into clay also found in this cave.

Les Trois-Freres (three brothers) is best known for the magician type figures portrayed on the cave walls and the combination drawings depicting man-and-beast.

In the area described, the caves are full of images--conservatively 15,000 paintings and engravings. The placement of the cave art deep into the caves seems calculated for the creation of surprise. Many are placed on walls or in passages in such a way that a flash of light reveals them as shattering, surprising images. In the Lascaux cave in the Les Eyzies Region, a burst of animals dominated by huge creatures with great horns seems to stream into a tunnel leading to deeper galleries. The cave artists were masters of this kind of special effect.

The paintings are the highest development of Paleolithic art. (Figure 3) The engravings are simpler, but the creation of both was by artists whose minds were occupied by the dissemination of new ideas. They saw beyond their daily lives and recorded their observations and inner visions on the cave walls. Their work gives us an insight into humanity's first ventures into the area of symbolic thought.

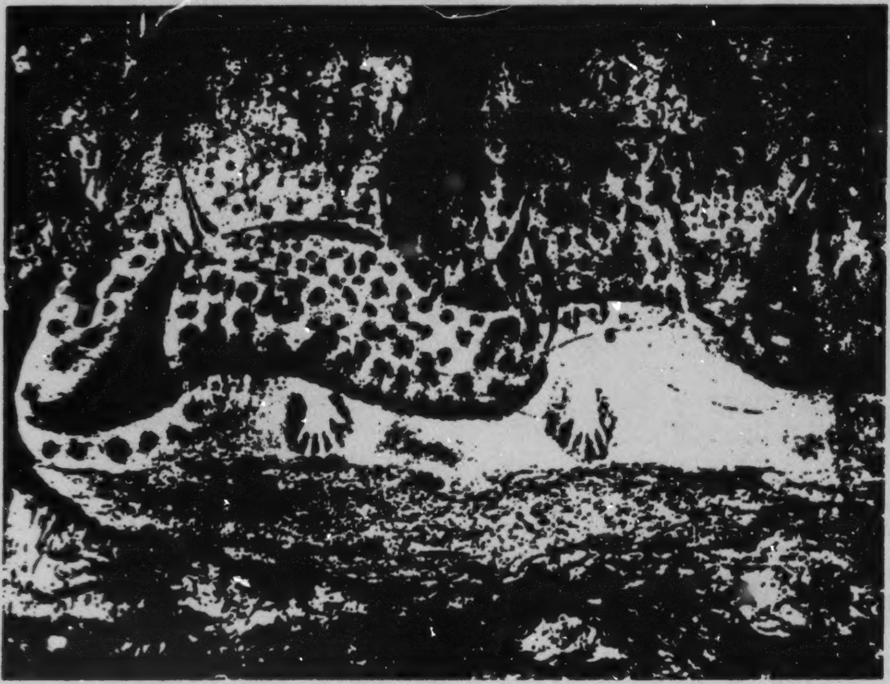

Figure 3. Cave painting from Les Trois-Freres.

Paleolithic people entered the caves as devout believers in the magic of the pictures and engravings. . .more than 85 percent of the animals pictured are of bison, wild cattle, and horses. Deer and mammoths are the next most frequent. Pictures of bears, lions, boar, and elk are the fewest. (Incidentally, these people shared their caves with cave bears, and the remains of 30,999 bears were found in one cave. The cave bear was as big or even bigger than a polar bear.) There is one sculpture of a bear in which marks and indentations on the surface indicate that the sculpted form was used for target practice with pointed weapons. In the Les Trois-Freres cave there is an engraving of a bear filled with spears and spitting blood. (Figure 4) We can assume that the bear was a respected enemy.

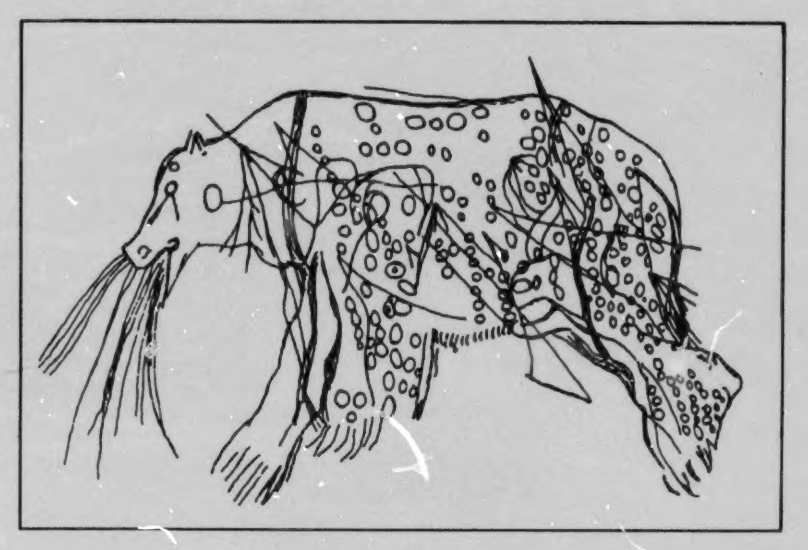

Figure 4. Engraving of bear.

Human figures are depicted in more than 200 drawings. The best known of these is the sorcerer of Les Trois-Freres in the Pyrenees. (Figure 5) It is a composite creature, part human, part animal, with owl-like eyes, wearing antlers and an animal skin. It is positioned on a chimney, four meters above the ground in an intensively decorated chamber. The creature seems to stare down like a presiding spirit. It is a carved image accentuated by black painted outlines.

Handprints are common in Paleolithic art. In the Gargas cave in the Pyrenees there are more than 150. (Figure 6) The artists had developed a primitive airbrush technique. The hand was held flat on a cave surface while a hollow tube distributed pigment around the outline. This is a negative image. Positive images were made by dipping the hand in pigment and pressing it on a cave wall. The negative images outnumber the positive, and in many cases the hands are mutilated. The paint on the hands may have been a badge of honor indicating communion with the spirits that lived below.

Why was this art placed deep within the caves? What is the significance of the subjects depicted? Research gives us some implications. The people of this culture were undergoing an information explosion. Complexity and conflict were on the increase. Hunting and hunting techniques were vital to their lives. There were epidemics, earthquakes, accidents, and natural disasters beyond their control. There was much information that had to be passed on.

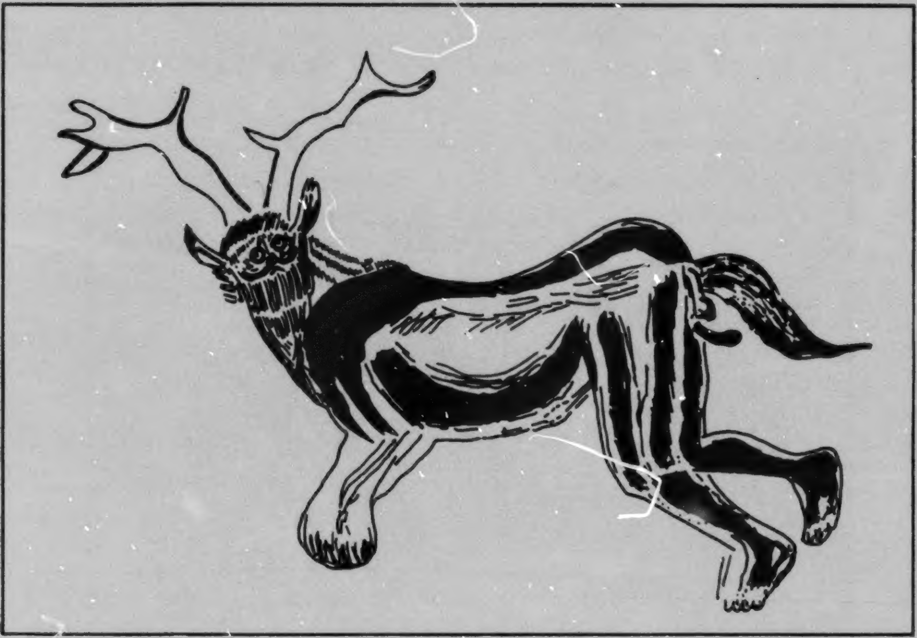

Figure 5. Sorcerer of Les Trois-Freres.

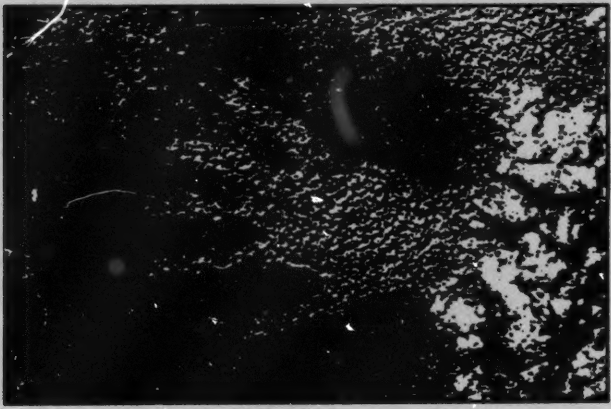

Figure 6. Paleolithic handprint.

They were not a literate people and yet some way had to be found to pass this information from one generation to the next. Knowledge had to be stored--it had to be memorized. Our ancestors devised ways to attach emotion to information for memory's sake. Each cave may have been a master plan designed for the needs of a specific group. The planning was elaborate and systematic. The initiation of the young was the purpose of this planning. Children's footprints preserved deep within the caves suggest the leading of the initiates through a dark and difficult route, a thoroughly planned obstacle course. As they were led through this strange environment, they probably reached a semi-hypnotic state induced by fatigue and apprehension. Then our ancestors used every means they could, shocking and frightening displays, singing and dancing, to bombard the initiates with a psychological assault on their senses. We can imagine rhythm and drumbeats to imitate the sound of animal hooves and dances conveying the movements of stampeding animals. All this magic prepared the young for their indoctrination. The tribal information was instilled. It was printed indelibly on their minds. It was transferred to the young to be passed on to the next generation. These ceremonies were the beginnings of myth and religion. The performances were pure theatre, and the results secured a future for our ancestors.

A multi-slide tape followed the spoken presentation and was introduced with the following words.

> Now we want you to go with us back to that period and culture. Imagine that you are a young member of a hunting, gathering society. You have observed the activities necessary for your group's continued welfare. You know by sight the animals most important. . .the ones you must fear and the animals necessary for your people's survival. One day you are led deep into the caves and your initiation begins.

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# RICHARD WAWRO, ARTIST

by

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"Persons are gifts. . . wrapped!
Some are wrapped beautifully! they are very
attractive when I first see them.
Some come in ordinary wrapping paper.
Others have been mishandled in the mail.
Once in awhile there is a special delivery!

Some persons are gifts which are very loosely
wrapped, not sealed.
Others are tightly wrapped, practically locked,
enigmas really, almost forbidding.
But the wrapping is not the gift."

Anonymous

How can we as teachers, as parents, as people come to accept each human being we meet as a gift and remember to look beneath and beyond the wrappings--so often there are many, many layers--to dis-uncover and to respond to the creative potential that lies dormant within each human spirit?

I must confess that had I first heard Dr. T. L. Pilkington's description of Richard Wawro:

> I first saw Richard at my clinic at the Royal Edinburgh Hospital in January, 1970. And at that time he was a rather tense, long limbed youth who was clearly very short-sighted in spite of his high power spectacles. His speech was limited. He had an impediment and he showed some degree of high note deafness. He couldn't read or write and at that stage he required some help in washing and in dressing himself. He was clinically in the moderate to severe mentally retarded range. (His I.Q. is said to be in the 30's.)

or had I met Richard on the street or in a book shop, or had he been a student mainstreamed into one of my classes, I might have responded very differently from the way I did when in October, 1976, I viewed a short, 10-minute television documentary, and saw six reproductions of some of his drawings during the Third International Film Festival on Psychiatry and Culture in San Antonio, Texas. Since that initial exposure I have traveled thousands of miles throughout the United States sharing his work and his story with school children and adults from all walks of life. Recently, I journeyed to his home in Edinburgh, Scotland, to meet him and learn more about him and his work. I have presently committed a great deal of my time, my energy, and my creativity to embody in a 16mm film the quality of Richard's vision and the special nurturing environment which has enabled him to share his gift with the world. Little did I suspect that my brief introduction to the life of this "severely, mentally and physically handicapped" young man would provide for my life the slight mid-course correction that would result in rapidly accelerating my own learning and in taking me toward new and unexpected horizons of thought, of wonder, and of beauty.

But, just one moment, perhaps I am ahead of myself. Just who is Richard Wawro and what is it about him that makes him so special? A brochure has this introduction:

> Richard Wawro (pronounced Vavro) was born on April 14, 1952, in Tayport, Fife, Scotland where he lived with his parents, a Polish father and a Scottish mother until 1960 when he moved with his family to Edinburgh where he has lived since. At 3 weeks of age cataracts were discovered in both eyes (a series of 4 needling operations followed) and it was determined that he would have badly impaired eyesight for life. At 3 years of age mental deficiency was diagnosed and the advice was given to 'put him in a home and forget him'! At 5 a further illness developed and was diagnosed as lymphosaccoma and massive radiotherapy followed. At 21 he was diagnosed as diabetic.

He is almost blind and yet he is a gifted and prolific artist. He is an artist in the unlikely medium of oil-bound crayon, and as a result, children identify with Richard's art in a very special way. The medium of crayon is one they know--they have used it for years--but never have they seen it used with such expertise and they simply shake their heads in disbelief. The younger the person the wider their eyes as they see each picture, perhaps because they have not yet lost the ability to be amazed, to wonder at, to stand in awe of, to marvel at a sight that is beyond anything they have ever experienced.

Despite the fact that he must work very close to the paper, about one inch away, he has perfect perspective and a delicate use of vivid color and shading. Since 1970 he has held numerous exhibitions throughout Europe in such cities as London, Paris, Edinburgh, and Krakow, Poland. In November 1977 his original work was first shown in the United States in New York City during a two-day conference on "Creativity with the Gifted and Talented" for the National Council of Teachers of English.

But, just a second moment, how is it that someone who cannot read or write, has limited speech, is very short sighted, and has an I.Q. in the 30's can be identified as gifted? Unfortunately, all too often in this country "gifted" is equated with I.Q. (usually 130 and above) or with a certain level of intellectual achievement. All too often identification is used to exclude ("get the population to a manageable size") rather than to include ("Meet the special, individual needs of and provide appropriate, educational opportunities for each student"). Certainly few people would even begin to suspect that someone in this culture who could neither read nor write and had been labeled with an I.Q. in the 30's could in any way be gifted. Richard's artwork disproves that (Figure 1). One person even wrote in the comment book at an exhibition of Richard's art, "Could you imagine having respect for the products of one in this condition?"

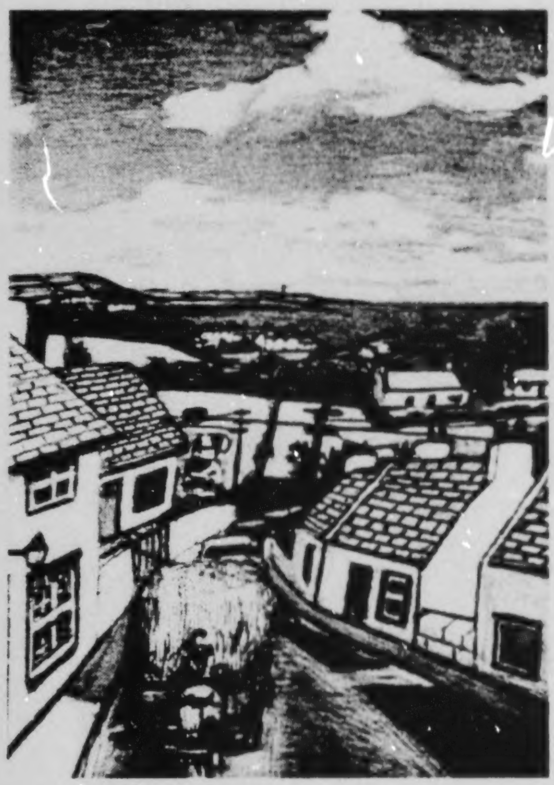

Figure 1. The Island of Scilly.
From the Private Collection of Richard "Cactus" Pryor.

In spite of all his "limitations" Richard is extremely aurally and visually literate. He has a phenomenal memory. He titles all of his pictures, and his keen sense of humor is evident when such titles as "A Cash and Carry in Nairobi," "International Festival Soup in the Gilbert Islands," "White Monkeys in USA Zoo," or "Wash-day in Pakistan" are seen in relationship to the actual drawings. He loves picture books and spends many hours with his National Geographic magazines. Through his insatiable love of books and through his regular and determined viewing of color television (only a few inches from the screen) he has taught himself broadly in the fields of geography and culture. Among his favorite television programs are Sir Kenneth Clark's "Civilization" series, Bronowski's "The Ascent of Man," and "The World of Jacques Cousteau." The seriousness with which he uses the medium of television as a source of learning may be seen in the following account: One evening during my recent visit I was relaxing before dinner watching the latest, thrilling adventure of "Wonder Woman." Richard, however, would have nothing of it and was upstairs watching a program of Scottish cultural heritage on another channel.

He has a very definite sense of rhythm and enjoys listening and moving to all kinds of music. His regular visits to his brother's room to listen with earphones and to move to popular music have almost worn a hole in the carpet. When he is drawing at home at his favorite spot on the kitchen counter, the small FM radio nearby is most often playing classical music. He also bought and has listened to and learned from the entire BBC sound effects record series. One can only wonder just how long we will continue to judge, and label, and try to program persons by focusing our attention upon what they cannot do or upon the wrappings, on physical attributes and I.Q. scores rather than placing our emphasis on what they can do and on finding ways to release the spirit that lives within them.

To merely happen upon Richard or to be happened upon by him is to meet a gaunt, intense, energetic young man whose quick movements and eager bursts to communicate in, at times, an over-loud voice and with a rapid speech that is often very difficult to understand might initially put one off. But, once again, the wrapping is not the gift.

To walk, as I have, into his world--a world where only four years ago a chance encounter with a pair of binoculars brought instantaneous delight and wonder, opening new possibilities for the perception of details and affording fresh inspiration for his beautiful drawings--is to walk into a country, a city, a home, an occupation center, a room, a book shop: in short; an environment of intense visual stimulation, of color, of quality (the manicured gardens, the neat stone or hedge defined fields), and of sound, and of a rich and complex cultural heritage. Richard's Polish father, Ted, is a great story teller and a gentle tease. His Scottish mother, Olive, in manner and tone and twinkle of eye reflects the quiet, sensitive, and sensible charm of this warm people. Richard's parents provide an atmosphere rich in caring, in enduring, in continuing to do what is necessary, ever holding the wonder and beauty and mystery of his incredible life very carefully, almost reverently, if not a bit fearfully, in their hands.

To say about Richard as some have in print, "The simplest task is quite beyond him," or "in his sadly incomplete mind," or to describe him as "helpless" or "hopelessly mentally retarded" is to ignore the complexity and depth of this person. One writer even went so far as to say, "Nature was malicious at the birth of Richard Wawro." Who is it that can feel confident to pronounce "hopeless" on any human being or situation or can evaluate a life's worth on the superficial circumstances or viewing his birth or early life? Who is it anyway that designed the standard which dictates what each person "should" be to be fully human?

Permit me to shift the metaphor I have been using from that of a gift and the wrappings that often obscure and not infrequently mislead us as to the nature and worth of the article inside. For a moment, I would like to consider another metaphor, a seed. Ira Progoff in The Symbolic and the Real raises an important and difficult question as he considers how to respond to the seed within rather than to the layers of dirt or rocks on top.

> But how can we perceive the seed in other human beings when their surface attitude is hard and opaque and often antagonistic, as though it were designed specifically to prove that no seed is there? (p. 164)

Or we might add, when, as in Richard's case, they have very limited, conventional means of communicating the nature and quality of the seed within? First, we can begin with the assumption that the seed of strength, of creativity, the source of life and health and flowering is indeed there deep within each person. And secondly, we can assume that if we act in such a way that we embody the first assumption in our relationship with that person that the seed will in fact grow and push itself upward and in its own time (not necessarily ours) will come to flower.

As a small boy, Richard was often frustrated and very unhappy. He did not speak out loud until he was eleven. To the question, "Why did you not follow the advice given so often to 'put him in a home and forget him'?" Mrs. Wawro answers simply, "it was just a mother's instinct." An institution might be a solution for others but not for this mother. She also trusted her own instincts when she discovered that for her own health and growth as a person she could not be with Richard all day every day. She needed help. So, when he was still quite young, Mrs. Wawro returned to teaching, and Richard stayed with Mrs. Currie, a neighbor with two young children of her own. There were a number of times when both Mrs. Currie and later his teacher at the junior occupation center were sorely tempted to abandon further attempts to work with him. Fortunately, however, it was in Mrs. Currie's home--in the kitchen--that this difficult little boy discovered on his own a piece of chalk and a small chalkboard which belonged to Mrs. Currie's own children, and he began to draw. He drew and drew, and gradually he found a way, his very own way, to communicate. It was several years after he had begun drawing before he could be persuaded to draw on paper rather than on his chalkboard. All the while it was because of the quiet patience of his mother and father and their determined self-confidence in the face of repeated advice to the contrary that enabled Richard to live at home rather than in an institution.

> But this is one of the things that love is called upon to do; to affirm and sustain the seed in a fellow human being even though no tangible evidence has been given of

> the nature and quality of the seed that is growing there . . . the capacity to love depends upon the capacity to feel the reality of the future before it has tipped its hand, before the seed has disclosed itself, and while there is still no more specific basis for judgment than a feeling that links the depth of one person to the seed in the depth of another. Love depends upon the capacity to reach beneath the surface of persons, to feel and touch the seed of life that is hidden there. And love becomes a power when it is capable of evoking that seed and drawing it forth from its hiding place. (Progoff, pp. 165-166)

Can we, therefore, dare to risk being gardeners rather than wood carvers or machinists or even potters in our classrooms, in our homes? Can we cultivate uniqueness? Can we allow each seed to grow and develop and flower without demanding that all the seeds do everything at the same time and in the same order? Can we acknowledge that, perhaps, the seeds are all different and seek to enable each to become what it is and not try to force it to become something else?

As we begin to think of ourselves as gardeners, as shapers of environments rather than makers of people, the words of Emily Carr, the artist, "The Little Old Lady from Nowhere," may take on added significance,

> look at . . . each seed according to its own kind, expanding, bursting, pushing its way upward toward the light and air, each one knowing what to do, each one demanding its own rights on the earth. Feel this growth, the surging upward, this expansion, the pulsing life . . . So, artist, you too from the depth of your soul, down among dark and silence, let your roots creep forth, gaining strength. Drive them in deep, take firm hold of the beloved Earth Mother. Push, push towards the light. Draw deeply from the good nourishment of the earth but rise into the glory of the light and air and sunshine. Rejoice in your own soil, the place that nurtured you when a helpless seed. Fill it with glory--be glad. (Hundreds & Thousands, p. 31)

Indeed, all of those who are privileged to share even in a small way in Richard's vision of the world and most especially his parents can rejoice and be glad that his struggle to overcome incredible physical obstacles, his journey ever pushing upwards toward the light has produced so many beautiful flowers--almost 1500 of his original drawings have been catalogued and shown in exhibitions throughout Europe and the United States. His spirit which for so long was buried deep within has been carefully nurtured by a quiet strength which trusted its own instincts, by a patient strength which endured without always knowing why, and by a gentle strength which continued to love without a single guarantee that even one flower would come into being.

From the very beginning Richard has sought the light. As a young boy he would lie on a mat in Mrs. Currie's backyard and look up toward the light kicking his heels in sheer delight. Today he stands before a new sheet of paper by the kitchen window looking up to see the sun. Richard has reached far down among the dark and silence and then stretched upward, with eyes wide open, to draw what he sees, and daily he rejoices and is glad.

# SEE LEVELS

by

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The date of the coming year is 1984, an auspicious Orwellian metaphoric number. In his novel, *1984*, we glimpse a society in which communication is not only unnecessary but unlawful. In Orwell's work the concept of "newspeak" represents a reordering and shrinking of language into terms that no longer require thought or definition, for the words and commands are, by law, meant to be interpreted for all time in the same robotic way by the whole population. With "newspeak," no listening is required, only obedience.

Newspeak is so comfortable in comparison with the quality of awareness necessary to attempt holistic and integrative understanding of a language. Whether in verbal, visual, or kinesthetic modalities, the languages we use must be continuously and painstakingly re-examined and re-defined in the light of experiential occurrences, intuitive insights, environmental concerns, and technological discoveries. New metaphors are born every minute. Without such attention to detail, our multi-leveled languages easily succumb to the level of political propaganda, public relations jargon, and advertising slogans, as Jung so aptly points out in reference to our visual language.

Lest we be accused of "newspeaking," the title of our conference, *Visual Literacy and the Human Potential*, needs some looking into. The words "Literacy" and "Potential" can be seen as antithetical. To be literate, one of the "Literatae," has a certain flavor of elitism attached to it, while the word "Potential" feels like a word that is far more democratic, open-ended, and not so grounded to the separatist and elitist framework. In too many societies on the planet, the "literate" few are responsible for the suppression of the human potential of the many. How then can we cross-connect "Literacy" and "Potential" so that they balance and enhance each other?

*Visual Literacy* can be a tool in the freeing of the *Human Potential* only if we understand the multi-dimensional aspects of "seeing." *Visual Literacy* must be defined in a way that will allow us to *develop insights* into those multi-leveled conditions that lead to the actualization of the *Human Potential*, for learning to "see" is a multi-faceted endeavor.

As an educator hoping to prepare a hospitable climate in which "seeing" can grow and expand, the author suggests that

Visual Literacy concern itself with the following five reference points:

I. Primary Visioning--
which deals with physiological survival and psychological patterning and is either hereditary or learned at a very early age.

II. Directed Visioning--
which deals with guided parental, social, and institutional education in the pursuit of predefined goals.

III. Inclusive Visioning--
which deals with the expansion of one's visual input beyond the realms of one's immediate visual environment.

IV. Internalized Visioning--
which deals with the search for the Self that SEES and the re-emergence of Beginner's Eye.

V. Actualized Visioning--
which deals with the implications of "having a vision," the correlation between responsibility and meaning, and the ethics of being of service.

Article II of the by-laws of our association contains a definition for Visual Literacy which reads as follows:

> Visual Literacy is defined as the group of vision competencies a human being can develop by seeing and at the same time having and integrating other sensory experiences.

In this paper, I hope to explore a multi-leveled methodological and living definition of visual literacy useful to the development of the human potential. Since any potential requires a force to become kinetic, it follows suit that the human potential needs a motivating energy to bring it into existence. I would hope that my thoughts concerning these five levels of the process of visioning will contribute in some small measure to the debate on how we, as visual educators, researchers, and artists might be of knowledgeable service in the evolution of perceptual awareness.

## Primary Visioning

Primary visioning deals with those discoveries that relate to the physiological and psychological "givens," those aspects of our physical and mental selves that seem to predispose us towards certain perceptual choices.

On the psychological side we have the groundbreaking work of Freud, Jung, and Piaget, to name a few, that allows us a measure of insight into our internal mental clockwork. When Mike and Nancy Samuels state that "what people 'see' when they look at an object is dependent on who they are and what they are interested in at the moment," we begin to understand that "seeing the world" is not a passive event.

Arnheim's research is most illuminating concerning the predisposition of visual perception. In his documentation of the Canyon Ledge Experiment, we are made aware that infants seem to possess an inborn hesitancy when encountering visually discernible high places. In the experiments, infants were placed on a clear supportive panel of plexiglass some distance above the ground and, depending on age and motor coordination, they either attempted to crawl towards a more visually non-transparent surface or evidenced tearful displeasure.

Among the more recent developments which seem to bridge some of the gaps between psychology and physiology is the work relating to the bicameralism of the brain. Within this context, Dr. Robert Ornstein believes that human beings can train their right cerebral hemispheres in order to build up and strengthen their intuitive natures by working with the visualization of geometric forms. He believes that this can result in the de-automization of the self, freeing the person's energies for more creative pursuits.

Labeling and classification dampen the holistic right-brain mode of perception, so that exercises must be developed to strengthen this mode. This can only help us to balance ourselves in the quest for the actualization of our human potential. We enter this world with a certain amount of our internal software working at peak levels. We must discover if these predispositions are liabilities or assets to us, discarding or balancing those instincts which would catapult us back to a darker more violent age, yet keeping and nourishing those aspects of the self that point the way towards a wiser future.

It is presumptuous and dangerous to speak of tampering with our visual genetics, yet it is worth debating. Is it in our best potential interest to discover our predispositions only to let them stand, or should we reinforce and/or alter them as our vision of future options seem to clarify. It is irresponsible to either press ahead or hold back without very serious thought. Should we consciously seek the atrophication of a portion of our instincts in order to better serve our potential nature? If the answer is "absolutely not!", then I would ask you to consider our fear of visually un-grounded movement (the Canyon Ledge experiment) in lieu of our potential journey into the bottomless depths of interstellar space. Should we be visually preparing our children for this aspect of the potential future of the human race by consciously training them to fear heights less? What will that do to the child who lives on the second or third floor of an apartment building?

It is the job of visual scientists and philosophers to research these dilemmas and hereditary predispositions so that our species can reinforce those traits, through parental guidance and formal education, that serve our human potential while working diligently for deliberate and responsible change when it becomes obvious that our perceptual bias is in need of a more balanced and open-to-adaptation approach.

## Directed Visioning

"Always in these matters desiring to be taught, then to teach."

Gabriel Biel (1425-1495)
Exposito Canonis Missae;lectio 53

"To teach is to learn twice."

Joseph Joubert (1754-1824)
Pensees

Directed Visioning refers to all of the educational processes (whether active as parental or academic, or passive as media-enhanced) by which we learn to read and interpret the visual symbols in our environment. Directed Visioning also refers to the methodologies used to train visual educators, graphic designers, fine and conceptual artists.

Guidance, direction, and the basis of all multi-faceted disciplined ways of seeing begin in the home, and only from there do they venture out into the community, the world, and eventually into the abstract and timeless conceptual universe beyond. Parents and guardians are the most powerful influences with which we come in contact. Children emulate what they see and feel far more than they obey the verbal commands and platitudes of the adult world, as every parent is painfully aware. As both educator and guide, parents have the responsibility to be as aware as possible of the outcomes of guided action and inaction. By the time a child is six or seven at the latest, the process of creative visualization has either been reinforced through careful nurturing or it has been denied through stereotyping and ridicule. For this reason alone, the society that does not actively promote intense and continuing adult education on all levels is doing an injustice to itself and to the very potential of the future health and growth of the Planet.

Visualization is a learned process that is life-long and open to continuous input and change, which, by definition, makes it a major ingredient in the actualization of our human potential. Visualization cannot occur within the context of anxiety and the goal oriented phobia that permeates too many of our social and educational environments. Our Human Potential cannot be tested and graded within the causal time-frames in which we imprison ourselves.

We would be ill advised to allow our left-brained logical selves to control our academic education at the expense of our potential to be holistic, intuitive, and able-to-see. We need to regain a balance in our schools, for all too often the head and heart are put into an adversarial relationship. If we continue to define the "basics" in the back-to-basics movement as new ways to intensify and magnify left-brain logical perceptions of the world, we will only succeed in driving ourselves into a perceptual schizophrenia, and we will have traded our dreams of human potential for the politics of stasis.

As educators, we have to pay close attention to the range of material to which we are exposing our students. If we seek only works that satisfy our administration's sense of propriety and security, wherein students are asked to regurgitate in an acceptable fashion the assumptions of the status quo instead of being stimulated and provoked to ask heretical questions that WE MIGHT LEARN FROM, we will be doing service to the entropy we fear. We must prod our evolution along, knowing that it is the responsibility of a potentially conscious species to follow our inquisitiveness to the very edge of comfortability when the Heart speaks. We will either find ways to incorporate mystery and joy into our curricula (not just grades 1 to 4) or our children will refuse to participate in our game, and will instead opt out for the more visually stimulating and less hypocritical environment of the video arcade, which will then deny all of us of the potential future that only cooperative effort can truly promise.

_Drawing on the Right Side of the Brain_; _The Geometry of Art and Life_; _Art and Visual Perception_; _Seeing with the Mind's Eye_; _Man and His Symbols_: These are a few of the books that stand out as educational tools because they ask more questions than they purport to answer. Are we serving our Human Potential by classifying so much of our literature as too radical, abstract, or mystical for educational exposure? Are we confusing Literacy, visual and verbal, with the hubris of comfortability and blind tradition?

We are so starved for a visual balance in our education that we are extremely vulnerable to the commercial visual media, not really caring to what message the medium exposes us. Unless and until we begin, in a determined manner, to balance our directed visioning in the schools through thoughtful, holistic methods we will fall prey, as will our potential, to the visual media as it continues to exploit and denigrate us with hysterical consumerism, sexism, and violence.

## Inclusive Visioning
(widening vision)

"America is one of many strands; I would recognize them and let it so remain...our fate is to become one yet many."

Ralph Ellison
epilogue to _The Invisible Man_

"Every style is but one way of looking at the world, one view of the Holy Mountain, which offers a different image from every place but can be seen as the same everywhere."

Rudolph Arnheim
Art and Visual Perception

"The components of Plains Indian pictographic art are abstractions, conventionalizations, and symbols of their material and spiritual life."

Sandra L. Brizee
Readings from the 14th IVLA convention

Our collective human potential is the responsibility of each individual human being; the sound of each unique bell tolls for all. To dispense with works of art as being too primitive or foreign to our present circumstance chains human evolution to a purely chronological time line, a dubious idea at best. The past has so much to give us as do alternate cultures and viewpoints in the present.

Using the excuse of "economic necessity" we too often plan our academic curricula in a nearsighted fashion, failing to see forests for trees, doing little or no service to the potential that exists within us.

We have become so hypnotized and captivated by statistical quantitative logic that we will support the addition of a course on Black History only if black students comprise a certain percentage of the total student population. We ignore the fact that the alternative historic viewpoints which allow us to see through the eyes and lives of others can, in fact, widen all of our visions and that this alternate vision can be indispensible to a balanced future.

Inclusive visioning plays a major role in our search for a more visually literate society. Through immersion in the aesthetics and philosophies of diverse cultures and disciplines, we become holistically aware of ourselves as part of a global reality, and we are therefore able to communicate with each other more effectively, for clarity is directly proportionate to both our commonality and the awareness and acceptance of difference. Just as in-breeding leads to the eventual degeneration of a species over time, so does our self-imposed visual parochialism lead to the deterioration of clarity and the eventual aesthetic blindness of our global society. Like astronauts, we can only "see" the total implications of our planet at vantage points some distance from the comforts of home.

When we see our universe in ways which are closed to our physical vision, through microscopes and telescopes, through x-rays, radio waves and infra-red imaging systems, we become aware of the infinite possibilities of vision and imagery.

State-of-the-art global communications technology necessitates a meta-level of literacy in all the disciplines, a level that reinforces the multi-cultural, -ethnic, -political, and -social aspects of our intricate and complicated human environment. To truly "see" the world, we must enlarge our ability to recognize and value other belief systems so that our balanced vision can be referenced to context. If we "see what we believe," as Richard Gregory states, then we must access as many viewpoints as possible before making uninformed and naive visual or verbal statements.

## Internalized Visioning
(deepening vision)

> "From a Hermetic point of view, the person who holds a sacred image in his mind, experiences the effects produced by that image, effects which extend to the world around him."
>
> Mike and Nancy Samuels
> *Seeing with the Mind's Eye*

Sir Arthur Eddington commented that "the true key to knowing the universe will lie in knowing ourselves." If "seeing" means "knowing" we have the fourth level of a balanced Visual Literacy. Margaret Fuller, Emerson, Thoreau and others in the American Transcendentalist movement in the 1800's, as well as Rogers and others involved in the Human Potential Movement in the 1960's, have all maintained that we have just begun to tap our vital and inherent powers of perception and creativity. The practices of Internalized Visioning can only help us to release our creative forces. The multitude of practices that fall under the heading of internalized visioning have been expounded upon in great detail in such works as *The Aquarian Conspiracy* by Maralyn Fergusson, *Seeing with the Mind's Eye* by Samuels and Samuels, and *Creative Visualization* by Shakti Gorain, as well as in the *Body Sculpting* confrontive psychotherapy of Virginia Satir.

An admittedly incomplete list of internalized visioning techniques reads as follows:

1. Meditation
2. Visually confrontive psychotherapy
3. Guided Imagery
4. Synaethesia exercises
5. Hypnagogic-Hypnapompic Imagery Awareness
6. Dream Journal keeping

Meditation techniques, of which there are several, have a two-fold benefit. The meditator is made aware of the great amount of control that she/he has over both emotions and the visualizing process, and the relaxation of the mind and body that results helps the meditator to be much more aware of the diverse input bombarding the senses.

Visually confrontive psychotheraphy (of which Virginia Satir's "body sculpting" is an excellent example) allows us to "see" our problems and our creative "blocks" so that we can be better prepared to deal with them.

In Guided Imagery, an individual or a group is asked to internally visualize a specific situation or event, while the experience is guided by an instructor or teacher. Any hint of disbelief, sarcasm, or hypocrisy in the voice of the guide will instantly negate the experience.

Synaesthetics is the practice of perceiving the world in a cross-perceptual mode, i. e., asking a class to graphically represent the smell of a rose or to sing the shape of a mountain. Like Guided Imagery, it must be formed around an instructor, at least initially.

Hypnagogic imagery occurs before the threshold of deep sleep, and hypnapompic imagery occurs just before waking. According to historic accounts, the discovery of the form of DNA and Einstein's first glimpse of the theory of special relativity utilized these methods. Alexander Graham Bell is said to have napped every afternoon in a sitting position, chin on hands, holding a cane. When passing from the hypnagogic state into sleep, the cane would fall and he would awake with a start. In his mind would be a clear vision of the solution to a pressing problem.

The usefulness of dream imagery has recently come under attack by Nobel laureate and biologist Francis Crick, who claims that dreams are nothing more than the brain cleansing itself of electronic impurities. This assumption, although technologically evidenced, is akin to the stand taken by a group of behavioral psychologists in the 1920's who said that mental imagery did not and could not exist. The value and existence of dreams, however, can only be decided on a one-by-one gestalt basis. No amount of theory can refute processes or practices that supply meaning and personal insight to a participant.

The concepts of internalized visioning techniques discussed above are visually summarized in Figure 1.

When Martin Buber speaks of seeing the Thou in a tree instead of the It of a future stack of firewood, he is giving us a metaphor for a level of visual literacy that stems from the deepest personal and symbolic risk-taking procedures in which a human being can engage--the visualization of the invisible thread of life that pulls our hunger for the human potential along, step by step.

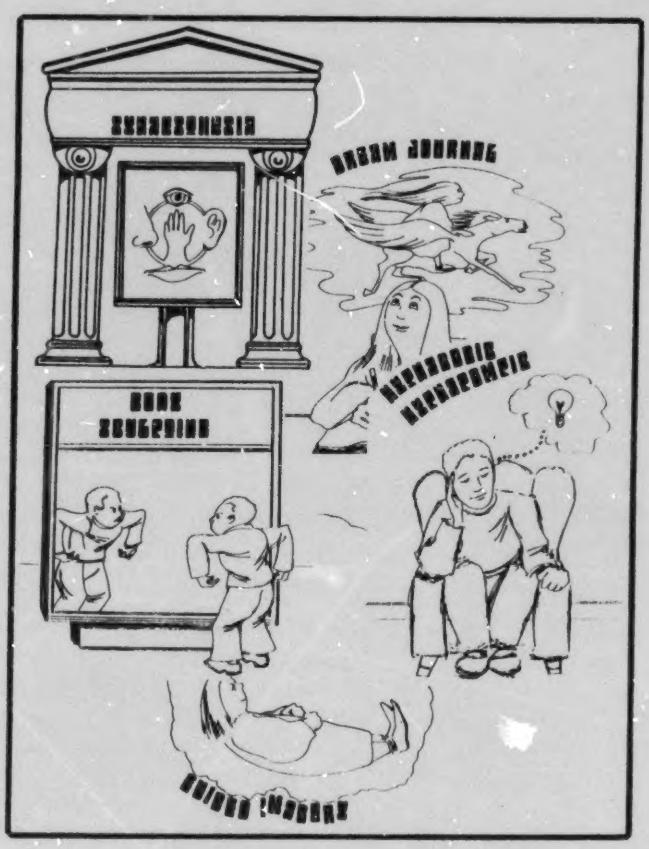
SYNAESTHESIA
DREAM JOURNAL
HYPNAGOGIC
HYPNOPOMPIC
BODY
SCULPTING
GUIDED IMAGERY

Figure 1. Internalized visioning techniques.

### Actualized Visioning
(the purposeful ascent of the visual self or
"bringing it all home")

"What efforts are we willing to put in to be truly ourselves, to reach our potential, and contribute to bringing Planet Earth to full fruition?"

Sister Bede Sullivan
Readings from the 14th IVLA convention

"Savage is he who saves himself."

Leonardo Da Vinci
the Notebooks: Vol. I Chpt. 1

"We have to upgrade our visions."

Rubie Dee with Ossie Davis
interview on PBS Latenight--April 19, 1983

Victor Papanek gives us the fifth part in our quest for a holistic definition of Visual Literacy in his book *Design for the Real World*. To be literate in any sense of the word is empty and meaningless unless that literacy motivates responsible action. If a Visually Literate person "sees" something, a problem that needs addressing or a wound that needs healing, that person responds with all of the experiential and disciplined tools at her or his command. Any form of supposed literacy that does not involve the active communication of one's observations or that refuses, through neglect or apathy, to be used as a creative tool to repair observed faulty conditions is an empty academic exercise. Anyone who can "see" (politically, aesthetically, environmentally, or in any other socio-perceptual arena) *acts* upon that vision!

Victor Papanek speaks to the soul of the designer and the educator when he speaks of the anesthetic of popular taste and commercial priorities and juxtaposes this with examples of responsible vision and the changes this vision motivates and catalyzes. Service to the community as a conscious inner and disciplined directive is a necessary stage of visual or any other literacy. We must find ways to give back the gifts and to share our vision of the future in the arenas available to us or we will cheat the human potential movement of its most needed ingredient, our participation and insight.

## Conclusion

Within the context of the human potential, Stevie Wonder and Ray Charles are no more blind than Helen Keller was. The blindness that should concern us most, as we approach the millenium, is the darkness that clouds the Heart and the Mind, for this has more to do with the vision that will eventually actualize our potential than will further analysis of the methods of seduction for our outer eyes.

As educators, artists, and individuals we must seek to become as Buddhas in the Marketplace, being aware of who, what, and where we are so that our individual potentials can reach out to illumine the dreams of others. We will be able to "see" only when we travel beyond the boundaries of our separate selves and begin to identify with the myriad of life in the world around us.

To be visually literate is to have a meta-vision that serves the potential interest of the entire world community, a vision that supports the knowledge that to act in a caring, loving, aware, and informed manner towards our living planet is a proof of literacy and brings us a step closer to the actualization of our human potential.

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# YOUR TELEPHONE BOOK--A BASIC KEY TO VISUAL LITERACY FOR ESL STUDENTS

by
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Probably the most pervasive piece of technology in the American culture is the telephone. It is an object most Americans take for granted as an extension of whichever hand they do not write with. As any traveler knows, the American telephone system is the most versatile and efficient in the world. It is essential to the American way of life, a common but powerful communications medium.

The telephone is the object of my discussion here, and particularly the telephone book as a means of teaching the capabilities of this instrument as well as its use as a kind of text for teaching communication skills to non-native speakers of English, in some schools more commonly referred to as ESL (English as a Second Language) students. Although working with ESL students is my paramount concern, it is obvious that most native speakers need and could be given equivalent training; the same techniques can be used in remedial or developmental English or reading classes. These days there are few avenues of common knowledge that can be taken for granted, and we cannot assume that everybody knows what versatile information resources the telephone and the telephone book are.

For the non-native speakers of English who study in American colleges, the telephone is not a simple instrument. They have not grown up with it in their homes. For immigrants or refugees it is one of the tools to be mastered in the new culture. Yet for most of them good telephone manners are part of doing and holding a job. The telephone presence is so obvious to native speakers that it is easy to forget its significance for people who are learning English as a second language, a cadre of people increasing on the American educational and economic scene.

First, let's look at the target population. Non-native speakers in community colleges or adult education programs are there because they want upward mobility but do not have language skills or they cannot pass the TOEFL test to enter more restrictive learning environments. Their communication skills are too minimal to get any but menial jobs. The grand American dream is followed by harsh awakenings. They must learn the communication skills essential for survival in the technological society. In the program at my college, where one-third of the urban campus's population are non-native speakers, a special program for them stresses a gestalt of communication literacies--listening, speaking, reading, writing, and visual literacy. To help the students negotiate the American culture and the world of work, three areas--communications, consumerism, and information sources, including those needed for college survival--form a nucleus in which the literacies are practiced. In the communications unit, the telephone is an example of an object in the environment touching upon all of the individual's communication skills.

An analysis of telephone skills makes apparent the applications demanding communications skills--listening, speaking, writing, and reading. Listening is the most difficult skill for all people; listening on the telephone demands a different kind of attention than does face-to-face listening with another person present. There is no body language to watch and to read--a kind of visual expression peculiar to each culture but helpful in interpreting how to send or receive a message. Wordless body language is easily read and interpreted by the eye in most classes I have worked with in a unit on visual literacy. Talking on the telephone is a different world. There are only an ear and a disembodied voice. Telephone listening requires a right brain activity which visualizes and interprets the mood of the speaker as well as the message. It usually involves writing a message in which the facts must be straight, names correctly spelled, numbers, dates, and times must be accurately transferred by the listener if a message is left. On such details hang the goodwill of a business and the job evaluation of the student who works or will work.

These skills are difficult for the non-native speaking students. The students lack a facile spoken vocabulary; they do not speak so that the listener understands their pronunciation; there is no observable body language to help them process a verbal message; and it is hard to listen and write at the same time if you do not know how to process what you are hearing and to spell it in transcribing the message. Having had student aides in my office, I am only too aware of the possibilities for garbling a message or of the panic engendered by the telephone when a shy Asian student must ask the caller to spell everything because she cannot understand what the caller is saying, and he cannot understand that his *l*'s are her *r*'s. The use of the telephone appears to be natural to most of us; to the non-native speaker of English it can be an ego-deflating experience.

To ease the student into the telephone message world, a film called *Telephone Manners* is an excellent introduction. (It is also suggested viewing for native American students, many of whom do not know how to take a telephone message.) This excellent visual presentation is built into a lesson which practices what the film preaches. The students are given a simple exercise while being prepared for seeing the film; they are asked to take notes on specific points; they are given a short grammar exercise around the vocabulary of the film; and finally they will go to the Learning Lab for a writing lesson. Thus they practice writing and note-taking as well as the visual and auditory attention required to get the message of the film.

The study of telephone use is also reinforced by role playing in which three or a pair of students write a scenario about a use of the telephone. With telephones in the studio, students are video taped as they act out the situation they have chosen. As they hear and see themselves in playback, they are able to critique their own body language, listening and speaking skills, and those of their classmates and evaluate themselves as communicators. They are not simply told; they can see and hear for themselves. Video is a powerful teaching medium not used nearly enough by most teachers. Our ESL teacher corps has learned to use it because it is written into the course syllabi. Once they have tried it and see student reactions, they, as one of them once said, "fall in love with the camera."

In this environment an obvious learning resource is also the telephone book, which the imaginative teacher can use as a text for teaching an array of skills, including language. It is cheap and easily available. Most students have access to one for practice exercises. The books can be collected from offices or colleagues getting new editions, or the books can be procured from the telephone company, which likes well-informed and courteous customers who save the company money and time. The collection can be easily stored in a classroom. It won't be stolen. Telephone books differ in different areas. Each teacher needs to work with the book(s) for the students' area of telephone contact. Where I live there are three white-page books (Maryland, Northern Virginia, the District of Columbia), plus the volume of yellow pages. One of the directories uses thirty-four pages of printed information about the telephone to familiarize users with this one single instrument.

The use of a telephone book as a teaching tool is so obvious that it might appear as if it were a Mickey Mouse kind of exercise. Look again. Have you analyzed your phone book(s) lately?

I would be willing to wager that relatively few Americans have really looked at their phone books as the resource and reference they are for many kinds of useful information. (Certainly, and sadly, our 23 million American functional illiterates are unable to do this.) For the student, especially the non-native speaker, the telephone is a help in mastering a common American technology, whereas reading the telephone book involves both verbal and visual literacy, and it is this combination I should like to address. I also emphasize that the kinds of things which I point out here are merely the tip of the iceberg for an imaginative teacher.

That the telephone book hopes the user can read and is verbally literate is apparent from the beginning. If the student with poor reading skills is given a lively-minded teacher, the verbal aspects in the preparatory reading matter can be used to teach vocabulary, punctuation, sentence structure, capitalization, and other structural and mechanical forms.

From the 34 introductory pages of the book one can teach some major problem areas: the use of articles, the use of ampersands and hyphens, spelling out numbers, and so forth. The teacher is the key.

As a reading exercise the telephone book makes certain assumptions about entry level skills. It assumes enough literacy to read about some of the telephone's functions which require making choices and understanding something more than simply how to dial a number. Dialing a number may well be all you think you will need to know how to do. However, if you have other problems and are able to read, the telephone book tells you how to solve them or whom to call for help. Finding a number assumes the user knows the American alphabet and can alphabetize. If a student knows neither, teacher-generated exercises from the pages of the telephone book are a good teaching medium. Use the overhead projector, of course!

And you soon discover that you must also know how single letters are alphabetized and how to find certain kinds of acronyms in the telephone book. The rules are *printed*, however, and you must *read* them.

This book is not like workbooks which contain exercises with which the student cannot identify. Students *need* to know how to use this book, and they know that it must be used in everyday life. In some households it may be one of very few books or the only familiar one around.

The book assumes you know how to spell. If you want to use the residence section, you need to know how to spell the name of your friend, the first name, as well as the last, and probably also the address--especially if your friend has a common last name for which there might also be multiple first names. If, for example, we look at the number of *Nguyens* in the Northern Virginia directory, we find that this Vietnamese name takes up two directory pages. You need to know *which* Nguyens--there are two Chans, three Hieus, four Hoans, five Longs. Often there are no distinguishing middle names. This exercise is helpful in making you aware that using the phone book can be like using the dictionary; you have to know certain things to begin with, and it is wise to get motivated to know them post haste.

On the verbal level, the book is rich in vocabulary practice for the non-native speaker. In addition to the practical vocabulary of the yellow pages, interesting or amusing examples can be drawn from the first page of the business section, and one can go on from there. If you were a newcomer to this country, what would be your impression of some of the entries like A Auld Guard Antiques? A Cut Above? A OK Printers, Inc.? A-1 Porcelain Repair? A Plus Rental Center? a Temporary Options, Inc. (lower case *a*???)? A Thieves Market? A Time Sensitive Courier Network, Inc.? A Touch of Class? A Touch of Green? AA Able Junk? and so forth. What do they *do* at these places--what is the difference between a touch of class and a touch of green? What *a pluses* does the rental center rent? Does one buy or sell to the thieves market. What is time sensitivity? Why is it *a* auld guard antiques when in class you are told *an* is used before vowels? And if junk is able, what is it able to do? Confusing, isn't it? But what a fun lesson if the teacher is clever!

On a non-verbal level the book is an interesting example of a combination of visual symbols, signs, and pictures in order to get people accustomed to the interpretation of visual language so vital not only to jobs and everyday functions but to the emergency signals which may mean saving a life. It helps to be visually literate--which many non-native students not yet verbally literate often already are.

As we look at the colorful covers of the three telephone books which are used in our area, we learn quickly to tell, not by reading, but by the colored *pictures* on the covers, which books belong where, and which to pick up for our use at this moment. Instant unconscious recognition. The District of Columbia's cover is a local photographer's aerial view of the city from the Capitol building to the Potomac, with the Washington Monument at midpoint, and the Kennedy Center in the foreground--flanked interestingly enough by the Watergate, renowned in TV, song, and story. Northern Virginia's cover is a russet autumn display of trees and birds, a hunter's cover; we are told it is from an original painting by a Virginia artist. Maryland is represented by a pennoned sailing ship reminiscent of the first settlers on the Eastern Shore. Each tome represents an image within the metropolitan area of the geographic area it represents--one knows *without reading* which book is for which state. If you're not all that verbally literate, you can still figure it out visually after the first time around.

To discover the *sources* of the pictures, consult the outside of the back cover. On the Maryland cover we are told the Maryland *Dove* celebrates the 350th anniversary of the founding of the State of Maryland. "The Maryland *Dove* is a replica of Lord Baltimore's Pinnace 'Dove' which accompanied the 'Ark' on the first colonizing voyage to Maryland. It is pictured here sailing past St. Clement's Island, the birthplace of the state." The back cover continues with other interesting history related to this anniversary. If you are even an *unimaginative* teacher, you can ring in some history and geography just about the covers.

There is also a kind of subliminal suggestion in the pictures used on the backs of the covers. In one we have the well-dressed Virginia blond mother and her pretty little daughter reaching out "to touch someone." (High tech, high touch?). There is on the wall behind them a picture of someone who could be grandma. On the D. C. cover a black child and her happy dog are staying "close with a long distance call" to what must be her grandparents if we read the picture right. On the Maryland book a white boy and his friendly dog are staying "close with a long distance call" to what must be his grandparents; grandma wears a frilly apron and is mixing something edible in a bowl. One could develop a whole exercise around the inferences to be made from these pictures--not to speak of the good old stereotype of smiling grandma in her apron. (Most of the grandmothers around where I work are dressed for success a la John Malloy!)

In our books, the telephone company's first concern made evident by the inside front cover is with the user's safety. The symbol for Emergency at the top of the page is easily learned. The visual prominence of the number 911 can be learned by a person of any age as a call for help. The use of visual signs for ambulance, fire, and police is consistent. The signs are repeated in the D. C. book under the heading "Service to Disabled Customers" but not in the Maryland book. By comparing and contrasting the various books for our metropolitan area we can engage in some spoken and written dialog about why the students think publishers did or did not make this distinction. This is an interesting exercise in comparison especially. Seeing similarities in the use of certain visual symbols and then arriving at some universal concept about their meaning, or about reasoning or cause and effect, are all using intellectual skills necessary to college progress. The use of comparison and contrast is a common classical rhetorical form taught in most composition classes.

The telephone company is taking no chances with your understanding of equipment. Verbal literacy is one thing. Being visually able to follow the numbered diagrams really tells the story and demands some skill in reading these kinds of diagrams, some visual literacy--and a chance to differentiate between Trimline, Touch-tone, or non-modular traditional rotary dial! Again a vocabulary exercise easily supported by the pictures. This one, like many of those in the book, is an exercise not only in visual and verbal literacy but also in a skill needed in a technological society, the ability to follow directions, to read a diagram, to make a relationship between the visual and the object in one's hand.

An interesting example of the notion of following directions is given us in the yellow-page directory which at the front has six pages of medical and first aid advice, illustrated with pictures of CPR, the Heimlich maneuver, what to do about staunching bleeding, and ending with the symbol of the medic alert bracelet worn by persons with allergies or special problems. It is really a remarkable first aid manual--what to do while you are waiting for help. The material is provided by the telephone company as a public service, written by the Maryland Institute for Emergency Medical Services Systems, University of Maryland, and verified by them and the Maryland Medical and Chirurgical Faculty. It should be consulted before an emergency occurs, of course, but the visual aids could assist if at the time of the emergency the user of the books knows they are there. The section makes an excellent reading lesson, including vocabulary and teaching of the way in which ideas are prioritized and numbered in a sequence--the first step to outlining ideas and learning to write paragraphs and compositions.

It can also be used to bring into the classroom for practice in visual literacy Red Cross first aid films and the physical education teacher with whom practice with oral verbal language can be used for discussion.

The concepts of local versus long distance each have their own visual symbols and are ways to teach comparison or contrast. One symbol is stacks of coins--more or fewer dollars. The local calling sections tell the student how to deduce or discern by a phone number from which section of the local area the call is coming, since the numbers are coded to the suburban section or town from which they come. This is a quick way to know, if the student works in a restaurant, for example, where a business's clientele is coming from.

The symbols for international calls include a representation of the globe in two hemispheres as well as the urban high rise and the tropical beach. As you turn these pages, labeled "International Calling," there is no question about the topics they cover, and one can read the symbols and pictures immediately after first exposure.

The same thing is true of the symbol for "Money Saving Tips" with its moon and stars to indicate the best time to call--at night, of course.

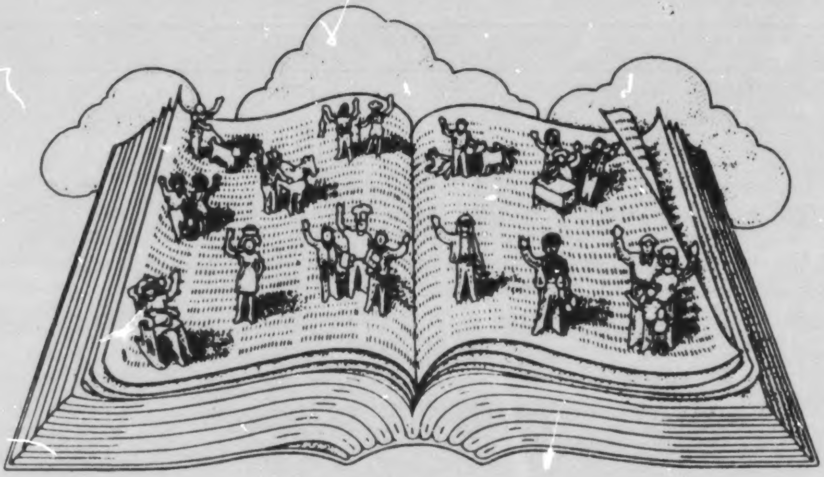
The telephone book's use of maps is an exercise in map reading and visually seeing locational relationships among the parts of the metropolitan area, but it also involves teaching direction such as north, south, east, west by using the visuals. The section about long distance calling begins with a map and the area codes for some cities as well as time zones, again an opportunity to teach about time and the geographic elements involved, as well as to point out the location of states and physical features like the Great Lakes and even the main rivers of the United States. The page on area codes for some cities is a good place to sneak in a little geography, because all of the major states are listed with their major cities.

In the Washington metropolitan area there are maps of the county and suburban localities, a road map of the capital beltway and if you want to get seats for a Redskin game look at the stadium seating map as you negotiate tickets. Which sights to visit in Washington? The list is there in the yellow pages followed by maps.

Whether it is directory assistance, consumer information, or services, the telephone book provides visuals to help the user with interpreting the verbal language. Nowhere is this more graphic than in the determination of the user's main responsibility which is, of course, in paying bills. Pictures of the bank and the mailbox are unmistakable and not too subtle hints.

Also in the Washington, D. C. area in each book is a significant section which is color-coded blue and deals only with government agencies. Their name is legion. It is fascinating to me that they are preceded in one of the books by two lovely personal names: Zemryl Zyzzle and, last but not least, R. ZZylch.

I have tried to point out possibilities for teaching non-native speakers from a book they are most likely to find in the place where they live. The telephone is the first arm of our technology with which they become acquainted, and the telephone book is a kind of basic text from which a motivated student can learn much about our culture and our country. The book is there in the student's apartment. Given a dictionary, a reading or writing textbook, and native intelligence and curiosity, the ESL student can make the telephone book a source of language acquisition and cultural information. A teacher can take advantage of this situation by teaching the ESL student how to open the doors to this opportunity for self help and get on the road to negotiating the society he is living in. The book combines both verbal and visual literacy cues in overt and subtle ways. The student must use both left and right brain in learning a new language and culture. An imaginative teacher can lead the way with this practical approach to adapting to the new society--to reach out and touch someone.



# RAPPORT AND HIERARCHY:
# YOU CAN SEE THE DIFFERENCE!

by
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In 1927 Edward Sapir wrote, "We respond to gestures with an extreme alertness, and, one might say, in accordance with an elaborate and secret code that is written nowhere, known by none and understood by all" (Sapir, 1927). In 1983, we still respond to the implicit behaviors Sapir referred to, and with the same extreme alertness. However, an explosion of scientific knowledge has occurred during the last thirty years (Knapp, 1978; Leathers, 1972; LaFrance & Mayo, 1978), and much of this accumulated knowledge has been proliferated by the popular press (Fast, 1970; Nierenberg & Calero, 1971; Davis, 1971). Today, many aspects of the 'elaborate and secret code' Sapir referred to have been dredged out of the unconscious, implicit realm to be studied, observed, and even enacted purposefully.

This paper concerns visual literacy in interpersonal relations. Rapport and hierarchy are defined and described as different interaction patterns. Then, the visual aspects of nonverbal behavior which typify rapport and hierarchy are reviewed. The goal of the paper is to elucidate some visual dimensions of interpersonal behavior, and in so doing, increase the reader's interpersonal sensitivity and enhance his or her skills.

Ethologists have explained that in the evolution of the higher primates and humans, certain emotionally motivated behaviors have developed into brief, stereotypic expressions which substitute for entire behavioral acts (Scheflen, 1972; Goffman, 1967, 1976). These signals, largely visual, are not codified as language but are a part of the 'elaborate and secret code' to which Sapir (1927) referred. Scheflen (1976) used the term 'reciprocals' to refer to the abbreviated forms of aggressive and affiliative sequences he observed in human interaction. He maintained that people play out quasi-dominance and quasi-courtship to manage their relations with others, without the actual consummations of either program necessarily taking place. Hierarchical interactions are emotionally motivated by aggressive or dominance concerns and rapport interactions are emotionally motivated by affiliative concerns.

Goffman (1967, 1976) used the term 'displays' as the equivalent of Scheflen's 'reciprocals'. He pointed out that displays are dialogic, occurring in statement-response pairs, so that one person's display tends to evoke a response in another. These paired responses signal the distribution of power or status between interactants. As such, the paired displays may be symmetrical (alike) or asymmetrical (differentiated). Symmetrical behaviors define equality between interactants, whereas asymmetrical behaviors set up power and status alignments. Power, as used in this paper, refers to the ability of one person to influence others to do what he or she wants them to do that they probably would not have done otherwise (Henley, 1976; Johnson, 1976). Status is ordinarily a derivative of power; the term refers to a person's social position in a dyad or group as it is conferred on him or her by that group (Henley, 1976).

## Rapport

Rapport may be defined as a subjective or intersubjective experience in which one or more persons perceive themselves as connected in a harmonious interaction. Persons express their perception of rapport as feeling in tune, in synchrony, or on the same wave length as the other. They believe they understand the other and believe the other understands them. Often, people express that they feel alike, similar, together and in essential agreement with each other. In rapport, people experience a mutuality of attention and understanding. This subjective or intersubjective experience is believed to be a precondition for trust, empathy, and persuasion; though studied mostly as an important part of the psychotherapeutic process, rapport is also believed to be an important process in friendships, family communication, business encounters and even brief, casual social encounters (Lankton, 1980; Lewis & Pucelik, 1982).

Watzlawick, Beavin, and Jackson (1967) proposed that all interactions may be categorized as either 'symmetrical' or 'complementary'. These categories are neither good nor bad, right nor wrong, normal nor abnormal; they are simply ways of describing patterns of interaction. Further, both symmetrical and complementary interactions serve important functions and must be present in a relationship, either in alteration or in different areas of concern. Rapport, as described above, is an example of symmetrical interaction. Watzlawick, et al. (1967), defined symmetrical interactions as those which are based on equality and minimization of differences. The authors asserted that partners in symmetrical interaction tend to mirror each other's behavior; however, their analysis explicated only verbal patterns. Goffman (1976) proposed that people align themselves physically with others in patterns of symmetry or asymmetry; when in symmetrical alignment, people announce to themselves and others that they are egalitarian peers. Their similar postures eliminate status or power differences. In the summary of research on the nonverbal concomitants of rapport which follows, symmetry is a key element. People who experience rapport seem to adopt and maintain similar postures and to move their body parts in shared rhythms.

During the early '60's, psychotherapists first reported "seeing" rapport. Scheflen (1963, 1964, 1965, 1972, 1974) observed films of psychotherapy sessions and other interactions and noted that postural similarity seemed to accompany rapport. He described pairs of people in rapport as looking like carbon copies or mirror images of one another, and he coined the term 'postural congruence' to refer to this matching of body postures (Scheflen, 1964). By contrast, he defined pairs to be non-congruent when their postural alignments showed non-association, especially when such alignments were accompanied by other non-associative behaviors such as lack of eye contact. Scheflen contended that postural congruence indicates association and involvement. He suggested that postural congruence happens frequently among friends, colleagues, and people who know each other and are engaged in a common objective. Scheflen (1965) observed that postural congruence is one of many reciprocals of affiliation which are exchanged in both courtship sequences and in the course of good, working rapport. The difference between courtship and rapport lies not only in sexual consummation (or not), but also in the occurrence of subtle, nonverbal behaviors that accompany the affiliative sequences throughout the interaction. Scheflen (1965) referred to these behaviors as 'qualifiers' which say, "This is not really courtship; it is mock courtship, or a show of affiliation each of us experiences toward the other and is willing to display." Thus, when qualifiers accompany affiliative reciprocals, 'quasi-courtship' or rapport is in progress.

Buchheimer (1963) was another observer of the psychotherapeutic process; his concern was with the study of empathy. Buchheimer noted, as did Scheflen, the imitative gestalt that occurs in psychotherapy sessions and he identified this as an early stage in the development of empathic responsiveness. He introduced the term 'confluence' to describe the movement or flow of an encounter, or a series of encounters in a relationship and the term 'tone' to refer to those sensory and imitative responses which are nonverbal and expressive. In this sense, tone refers not only to auditory processes, but to visual and kinesthetic processes as well. Buchheimer reasoned that to the extent interactants are sensitive to tone, confluence exists and the two interact in an expressive harmony or unity.

Charney (1966) analyzed a filmed psychotherapy session and found that client and therapist spent more time in postural congruence as the session progressed. When in postural congruence with the therapist, the client made verbal statements that were positive, interpersonal, specific, and bound to the therapy session. When non-congruent with the therapist, the client made statements which tended to be more self-centered, negative, non-specific, self contradictory, and non-referenced. Charney, like Scheflen, concluded that postural congruence is a behavioral indicator of the rapport or relatedness between client and therapist.

LaFrance and Broadbent (1976) went to the college classroom to investigate the relationship between what they termed 'posture sharing' and rapport. They observed the degree to which students in a discussion class mirrored their teacher's posture and they administered questionnaires to the students to assess the degree of rapport and involvement they experienced during the class interaction. The researchers found a significant positive correlation between the amount of posture sharing a student engaged in with the teacher and his or her ratings of involvement and rapport. In a second study, LaFrance (1979) measured the amount of student-to-teacher posture sharing and student reports of rapport felt with their teacher during the first and final sessions of a six-week summer school class. LaFrance reported a positive relationship between postural sharing and rapport; a time series analysis revealed that the more posture sharing in evidence during the first session, the more rapport a student expressed then and during the final week. LaFrance suggests that posture sharing is a prior condition of rapport, possibly a communicative device that assists the development of smooth flowing interaction.

Trout and Rosenfeld (1980) assessed the effects of postural congruence (congruent-noncongruent) and postural lean (forward, upright, backward) on observers' judgments of psychotherapeutic rapport. Subjects viewed silent videotapes of the bodies of pairs of actors designated as therapist and client. Results showed significant main effects for both postural congruence and postural lean on observers' judgments of rapport; congruence and lean were judged to reflect significantly greater rapport than other conditions. The videotaped segment in which the therapist was both congruent and leaning forward received ratings of rapport that were significantly higher than all the other videotaped segments. Trout and Rosenfeld thus provide support for the relationship between postural congruence and rapport.

Other researchers have studied the complexity of body movement in social interaction; they have noted that rhythms, as well as postures, are frequently shared by those in social interaction. Condon and Ogston (1966) analyzed high-speed motion film frame by frame, recording changes in the movement of various body parts of pairs of people. They reported a remarkable integration between a single individual's body movement and his or her speech at sub-second time scales. They coined the term 'self synchrony' to refer to the organized patterns of change that occur within one individual as his or her body 'dances' to the rhythm of his or her own speech. The perceptual basis of self synchrony appears to be auditory; the rhythms of a person's speech provide the music for his or her body to dance to. When the self synchronies of two or more persons correspond, Condon and Ogston (1966) define 'interactional synchrony' to be in progress. Condon (1975, 1979) and Condon and Sander (1974a, 1974b) suggested that interaction synchrony is accomplished primarily through 'rhythmic entrainment'; that is, the listener enters the speaker's tempo via auditory attending, not through visually monitoring the other.

Kendon (1970) also studied interactional synchrony; he was interested in its possible communicative functions. Like Condon and his associates, Kendon studied films of people in interaction. He noted many different time scales of kinesic behaviors, ranging from long term postural congruence to sub-second changes. Of particular interest to Kendon were units of mirror image synchrony during which listeners seemed to "dance the dance of the speaker." Kendon determined that turn-taking took place at these heightened moments of synchrony. He suggested that this mirror image synchrony is the result of an intermittent tracking process which is visual. Specifically, listeners visually attend to a speaker intermittently, but are especially attentive at turn-taking moments in interaction. Kendon suggested that other degrees of synchronous behavior may serve other functions. For example, he suggested that the more general and pervasive synchrony Condon and his associates described contributes to the sense of rapport interactants experience with each other (Kendon, 1970).

The growing literature in neuro-linguistic programming synthesizes scholarly knowledge about the relationship between postural congruence, interaction synchrony, and rapport and provides practical strategies for achieving and maintaining rapport. The skill of 'pacing' is defined broadly as meeting another person at his or her model of the world and establishing an unconsciously perceived affinity (Lankton, 1980; Grinder & Bandler, 1981). In a practical sense, pacing involves carefully observing another person and then subtly mirroring the observed output behaviors back to the other. Deliberate pacing, like naturally occurring postural congruence or interactional synchrony, should be out of the conscious awareness of the person being paced. What he or she should experience is a growing sense of rapport. Pacing another person may include mirroring another person's posture; echoing voice tones, rhythms, and rate; matching the other's breathing, blinking, body tensions and other unconscious behaviors; and reflecting facial displays. In the verbal channel, pacing involves reflective listening, paraphrasing, and using similar sensory based predicates. The objective is not to achieve sympathy or to take on the pain of the client; rather, the objective is to gather sensory information from the client, and to reflect this information back to promote understanding, acceptance, and rapport.

Effective pacing has other potential uses and advantages in therapy. When a therapist paces a client, the imitations become a part of the therapist's experience; he or she gains a great deal of process information which can be highly useful in determining how the client attends to experience, recalls or constructs memories, and represents experience. Such information is of great value in suggesting strategies for bridging the client from his or her present state to desired state.

Third, the unconscious feedback loop serves yet another useful function for the therapist. The client builds a tendency to do what the therapist does, since the therapist is doing what the client does. This openness to influence enables a graceful entry point for the therapist to offer suggestions and leads. These may be introduced first in the unconscious, nonverbal channels to assess the client's readiness for influence. For example, if the client follows a subtle, nonverbal lead, she or he is likely ready to accept further leads from the therapist. If the client does not follow such a subtle lead, this refusal signals the therapist that his or her timing for intervention is wrong and that further pacing is necessary. Furthermore, if the therapist leads subtly in an unconscious channel and the client follows, and then the therapist introduces a lead of a more conscious sort and the client does not follow, the therapist gains information that his or her strategy was inappropriate. Such feedback loops as these enable the therapist to promote harmony and confluence in sessions; the timing or progress of therapeutic change efforts is determined by the client's readiness, and the appropriateness of the strategies themselves receive comment by the client.

Fourth, another phenomenon has been noted by many helping professionals as they learn the gentle art of pacing--the tendency for both the pacer and the person being paced to enter a very deep state of rapport or a light trance. In such a state, they experience great openness to mutual influence. This mutual susceptibility to influence is reminiscent of the psychoanalytic notion that empathy involves mutual transference (Buchheimer, 1963). To workshop trainees, this has meant that who paces and who leads becomes unclear after awhile. To more advanced students of neuro-linguistic programming, this is a powerful key to hypnotic induction (Grinder & Bandler, 1981).

To summarize, postural congruence and interaction synchrony accompany or promote rapport. In normal interaction, these occur as unconscious processes; people attend to each other visually and auditorily and adjust their nonverbal behaviors to one another. However, the unconscious process can be made conscious, and by subtle pacing, one person can intentionally promote the experience of rapport with another. This knowledge and skill base should be of great interest to those in sales, management, education, psychology, and human relations, as well as to those in people-helping professions.

## Hierarchy

Hierarchy may be defined as a subjective or inter-subjective experience in which two or more persons perceive themselves organized by rank, one above another, or one below another. Persons express their perception of being in rank by knowing their place and by knowing other people's places as well. Hierarchy depends upon a differential distribution of power and status among people and their willingness to behave appropriately toward others on the basis of their assigned or perceived differences. People typically feel dissimilar and unfamiliar with one another in hierarchical exchanges. They sense a certain mystery about those of different rank, and there is a tendency to feel that one's superiors and one's inferiors are unknown and unknowable. Hierarchical organization, with its up-down chain of command, is believed to be the most efficient way to establish and maintain social order and to conduct the business or defense of large numbers of people. Often hierarchy is set by the social or cultural context, as in the case of parent-child, doctor-patient, teacher-student, and manager-subordinate. However, hierarchy may be the characteristic pattern of interaction of any two (or more) people.

Watzlawick, Beavin and Jackson (1967) use the term 'complementary' to describe interactions which are based on inequality or difference. Their theoretical description of a complementary interaction squares with Goffman's (1967, 1976) description of two people in asymmetrical alignment in a social situation. The behaviors of the pair form a Gestalt or pattern which defines one-up and one-down, one dominant and one submissive, or one primary and one secondary. The different behaviors presented by partners interlock with each other, or are fitted together well. Watzlawick, et al., (1967) stressed that one person does not impose complementarity on the other; rather, the behaviors of the two each presuppose the other's behavior and provide reasons for such behavior. Again, these authors stressed that healthy, well functioning interpersonal relationships include both symmetrical and complementary patterns of interaction, either in alternation or across different areas of concern.

Ordinarily, hierarchical interactions serve to confirm persons and to bring predictability and order to human affairs. However, not all hierarchical interactions are healthy and functional. Hierarchy presents us with several potential pathologies--rigidity of roles, obsessive power struggles, and disconfirming escalations.

Rigid complementarity in male-female relations has been described as 'normal neurosis' by Putney and Putney (1964). The pathological syndrome is as follows: (1) each person in a romantic pair assumes a limited, stereotypic identity and thus curtails his or her own autonomy and growth, (2) each projects parts of the self onto the other and thus lives in self-alienation, and (3) both persons seek and despise the aspects of the disowned self in the other. Rigid complementarity in other contexts such as parent-child, doctor-patient, and teacher-student can also approach pathology when growth and change in the less powerful member is thwarted or not acknowledged by the more powerful member. This situation can lead to relationships characterized by seemingly unending power struggles or to relationships in which the interlocking roles stabilize the dysfunction of one or both partners (Watzlawick, et al., 1967).

Power struggles amount to an escalation of dominance reciprocals (Scheflen, 1963, 1972) or to symmetrical escalations (Watzlawick, et al., 1967). The simultaneous or synchronous expressions of dominance reciprocals or displays by two people may take the form of quasi-dominance or may proceed to aggressive interactions which are physically and emotionally abusive for one or both parties. Quasi-dominance programs or power struggles proceed in dominance-dominance pairs but with the addition of 'qualifiers', or accompanying signals that announce, "This is not really a fight; it is a mock battle, or a test of the strength each of us has and is willing to display to the other." Qualifiers are usually brief displays such as smiles and glances. Scheflen (1972) used photographs to illustrate a quasi-dominance interaction between two males. They exchanged signals of threat and preparedness, one with thumbs in his belt, the other with hands on his hips. As one clenched his fist, the other stepped forward, raised his head, pointed his finger in the other's face, and made a verbal threat. The two pushed each other around a bit, with occasional smiles and laughs. Scheflen explained that the interaction was playful, not serious--a mock battle. Without qualifiers, a symmetrical escalation of dominance displays leads to emotional and/or physical battles which escalate until someone acquiesces or until the point of exhaustion or injury is reached; then, a temporary truce is set until the next go-round. Watzlawick, et al. (1967) analyzed the tactics and rules of George and Martha in "Who's Afraid of Virginia Woolf?" to elucidate symmetrical escalation.

Finally, disconfirmation of one or both persons can result from certain kinds of rigid complementarity; these have been discussed as sadomasochistic relationships, 'gruesome twosomes' (Scheflen, 1960), 'collusions' (Laing, 1961) and 'neurotic locks' (Rubin, 1983). The pathology arises when one person, A, demands or requests that the other, B, respond to A or confirm A in a way that is at odds with the way B really sees A or B sees himself or herself seeing A (Watzlawick, et al., 1967). Person B is presented with a dilemma; compliance with A's request produces self-disconfirmation, whereas failure to comply with A's request results in a disconfirmation of A. Such interactional patterns rarely culminate in open conflict; rather, the conflict settles in one or both partners internally. Apart from one another, each partner in such an alliance may function well, but together the two manifest the pathological pattern. Partners in such alignment tend to feel frustration and despair; they experience self-estrangement, internal conflict, and depersonalization. Breaking such patterns of interlocking behavior can be difficult. Death or divorce do not necessarily free a person of the pathology; many caught in 'neurotic locks' only enlist the participation of someone new in the old interaction pattern (Rubin, 1983).

Descriptions of hierarchical alignments have appeared in the literature detailing many asymmetrical possibilities (Nierenberg & Calero, 1971; Scheflen, 1972; Henley, 1976; Goffman, 1976; Mehrabian, 1981). The ability to discern these forms, in addition to those of rapport programs, contributes significantly to visual literacy in interpersonal relations.

Goffman (1976) and Henley (1976) have both investigated the hierarchical nature of male-female interactions. Goffman analyzed nearly 500 advertising photographs and identified six themes to describe how males and females were posed not only to sell products, services, and ideas, but also to affirm the social order of masculine dominance and feminine submissiveness. Henley (1976) examined 'the vertical dimension' of human relations to explain how micropolitical gestures of everyday interchanges not only facilitate social interaction but also serve to define and maintain social control. The poses and gestures Goffman and Henley identified announce power alignments in other dominance situations that are determined by context, as well as in relationships which involve dominance.

The first theme Goffman presented is 'Relative Size'. Size in general, and height in particular, express power, authority, rank, office, or renown, according to Goffman. Henley similarly identified expansion-constriction as a micropolitical announcement of power or status. Both researchers contended that dominants (males) expand their bodies to take up space and that subordinates (females) constrict their bodies to take up as little space as possible. Those with power walk tall, with raised shoulders, chins up, and heads elevated on the vertical axis; by contrast, the less powerful shrink, slump, shuffle, drop their shoulders, cant, and bow their heads. More specifically, males spread their legs, maintaining a wide intrafemoral angle when sitting, whereas females hold their thighs close together. Similarly, dominants spread out their arms and subordinates tend to hold their arms close to their bodies. One particularly powerful arm position, frequently displayed by males and infrequently displayed by females, has been called the 'power spread' (Nierenberg & Calero, 1971). The arms are spread out with palms at the back of the neck. Nierenberg and Calero elaborated on other ways dominants express their power: hoisting a leg over the arm of a chair, placing feet on furniture, straddling a chair turned backward, leaning on property, and marking territory with belongings. Spiegel and Machotka (1974) found that subjects viewed relative dominance in three figures postured with different degrees of expansiveness. The figure actively gesturing appeared the superordinate and most important; second in dominance was the figure with hands on hips; and, finally, the least dominant figure stood with hands behind the back. Closely associated with relative size is the degree of relaxation or tension in the body. Henley (1976) and Mehrabian (1981) both stressed that dominants tend to be more relaxed, informal, at ease and loose in their posture and demeanor than subordinates. The less powerful tend to hold more body tension, remain formal and at attention, and be more tight in their posture and demeanor. For example, dominants are likely to lean back in their chairs, spread out their arms, and cross their legs in a broken four; subordinates are likely to sit up straight with legs and arms held close to the body.

Goffman's second hierarchical theme concerned 'Touch'. Feminine touch involved tracing, caressing, and cradling whereas masculine touch involved utilitarian intent--grasping, holding, or manipulating. Several researchers have indicated that the prerogative to approach and touch belongs to those at the top of the hierarchy (Goffman, 1976; Henley, 1976; Mehrabian, 1981). Subordinates either do not share the same privilege or else their approach or touch carries a different meaning. For example, doctors touch patients and nurses, but patients and nurses do not typically reciprocate. Supervisors touch subordinates, but not vice versa. The boss may touch the secretary, but the secretary rarely touches the boss; if she does, sexual motives are inferred. In the military, salutes go up the hierarchy, but handshakes are extended downward. When a lower status person initiates approach or touch with a higher status person, his or her behavior may be taken as affront or insubordination.

The third theme Goffman illustrated was 'Function Ranking'. Photographs in this collection featured males and females in face-to-face interaction with the male in the lead--guiding, teaching, controlling, knowing. Females in these photographs showed deference, attention, and obedience. Henley (1976) has reported that females tend to open their eyes wide and arch their brows to signal their attentiveness and watchfulness. They tend to look more, and to avert their gaze more; subordinates in other social contexts likewise behave this way. Mehrabian (1981) pointed out that dominant people can afford to be relaxed and inattentive, but that subordinates remain watchful due to their fearfulness in the situation.

Photographs of 'The Family' portrayed a fourth theme. The symbolic structure of the family was reflected in postural alignments which conveyed unity between father and boy and between mother and girl. In addition, father often stood outside the physical circle of mother and children, showing that his relationship to them involved protectiveness. Nierenberg and Calero (1971) pointed out how those in authority often control others from a distance; they summon them by beckoning, direct them with gestures, and control their actions by pointing. In addition, Henley (1976) and Knapp (1978) discussed how high status persons are accorded greater interpersonal distance than peers or subordinates.

'Rituals of Subordination', the fifth theme, included photographs illustrating dominance-subordination reciprocals or displays. Lowering of the body in the up-down dimension indicates subordination; thus, lying positions on the floor or on beds signaled defenselessness, dependency, and sexual availability of females. Males were almost always taller than or posed higher than females in the advertising photography. Canting of head and body by females was taken as an expression of subordination by Goffman; the effect is that of lowering the self relative to others present. Spiegel and Machotka (1974) found height to signal dominance, except when accompanied with a bowed head. Another variation of up-down power statements takes place in handshakes. Nierenberg and Calero (1971) explained that presenting the hand palm up during a handshake signals subordination and submissiveness; presenting the hand palm down evidences dominance. 'Steepling' is a gesture in which the fingertips are brought together and positioned at some point mid-chest to forehead. Nierenberg and Calero (1971) and Birdwhistell (1960) have regarded steepling as a confident, smug, proud gesture of dominance; the higher the steepling relative to one's body, the greater the dominance display. A widely used gesture of subordination Goffman includes in his photographic illustrations is the smile. Smiles have been understood as appeasement gestures by Henley (1976) and as ritualistic modifiers which signal nothing antagonistic is intended or invited (Goffman, 1976).

Goffman's final theme, 'Licensed Withdrawal' was illustrated by photographs in which females removed themselves from the social situation psychologically, leaving themselves unoriented and dependent on the goodwill and protection of others. Ways in which they achieved psychological leaving included emotional flooding out; expressing shyness, fear, or laughter; mentally drifting; snuggling and nuzzling; or posing behind other people, objects, or animals.

To summarize, hierarchical interactions are characterized by the exchange of interlocking, asymmetrical behaviors which affirm the relative distribution of power and status among interactants. Hierarchical interactions reinforce the status quo of social situations, or of particular relationships, and facilitate social intercourse. Hierarchical escalations or power struggles occur with the bidding and counter-bidding of dominance displays by two or more persons. These interactions are instable and volatile. They may proceed as quasi-dominance programs, with accompanying nonverbal qualifiers that signal the friendly nature of the aggressive sequences; conversely, the escalation may proceed to combat, culminating in acquiesence by one, or physical or emotional exhaustion by one or both. In contemporary U. S. culture, there is a reluctance to acknowledge power issues explicitly; we persist in believing what Henley has called 'the last great American myth'--that we live in a democratic and egalitarian society. We do not often comment explicitly on power issues, either through verbal language or through consciously enacted rituals of exchange. We manage power and status issues subtly and implicitly in nonverbal channels, just at the edge of the unconscious.

## Conclusion

Rapport and hierarchy have been described as two different patterns of human interaction. Rapport is based on the exchange of emotionally motivated affiliative displays and hierarchy is based on the exchange of emotionally motivated displays of aggressive or dominance reciprocals. The behaviors of those enacting rapport are equivalent and similar. Visually accessible descriptors of rapport include postural congruence and interactional synchrony; the literature on these subjects was reviewed. Further, the suggestion of neuro-linguistic programmers was entertained: that any behavioral output may be mirrored in imitative gestalt in rapport programs to signal understanding and acceptance. The behaviors of those enacting hierarchy are differentiated and dissimilar when social order is affirmed; interaction then proceeds with dominance-submissive clarity. Dominance struggles ensue when the behaviors of two or more people include equivalent and similar aggressive displays. Literature describing interlocking dominant-subordinate reciprocals and power struggles has been reviewed.

Visual literacy in interpersonal relations includes knowledge and skill at four levels. First is the ability to discriminate the kind of interaction that is taking place. Is the interaction motivated by underlying affiliative or aggressive tendencies? Are qualifiers present to further distinguish the nature of the interaction as quasi-courtship (rapport) or quasi-dominance (testing of power)? How is visually observable behavior integrated in the stream of auditory and verbal behavior? With knowledge and skills at this level, people are able to recognize and analyze interactions. They are able to conceptualize about the behavior of both individuals and systems.

A second level of skill and knowledge is the ability to flexibly enact the appropriate behaviors of various programs--courtship, rapport, both sides of hierarchy, and power escalations. Such skills provide persons with maximum flexibility as communicators in a wide variety of human encounters.

The third level of skill and knowledge is the ability to determine the situational appropriateness and effectiveness of each program. With this level of expertise, judgment and criticism develop. Ethical considerations arise. The deeper implications of social order are sensed. Possibilities and inevitabilities are intuited. The need for change and the strength of persistence occur.

The fourth level of skill and knowledge is concerned with intervention and change. How does a therapist behave to enable a couple to break a neurotic lock or a pathological power struggle? How does an awkward teenager learn the dynamics of courtship, the price of machoism and coquettery, the value of friendship? How do change agents work with disenfranchised persons and groups--to raise consciousness about social conditions, to educate people about their roles in oppressive interactions, to loosen the fiber of individuals and groups for experimentation and change?

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# ENHANCING HUMAN POTENTIAL THROUGH RESEARCH AND THEORY

Griffin and Whiteside begin the section on research and theory by categorizing the literature into three areas: theoretical, visual language, and presentational. They particularly note the need for further research in the design of communication visuals. Several authors address this topic, including Blinn and Blair with their analysis of recruitment materials used in higher education, Gustafson with a descriptive survey of educational print materials for non-literate Haitian women, and Hortin with his seven steps of participatory instructional design. Another study in this area is Pettersson's research on the development of a picture readability index which can be put to practical use in the design and production of visuals for instruction. Fleming also explores the design of instructional materials, investigating potential cognitive problems where words and pictures are mixed indiscrimately.

Interest in cognitive style continues with the work of Lampe, focusing on the relationship between field dependence and the ability to recognize visual dominance. Eshpeter and de Leeuw concentrate on recognition and understanding of photographs and believe that any individual can be taught to become more visually literate, as illustrated by their work with young children.

The concept of attention is addressed by Clements as he reviews three learning theories to provide insights into why the learner attends. Jacobs follows with general guidelines for television programming based on studies of children's attention.

Clark's interest in the younger child has resulted in the development of an instrument to test children's abilities to form and generalize concepts from visually complex art reproductions. McIsaac uses photographs with university students, and Gonsalves examines the long term effects of a freshman level art course on student attitudes.

Librero and Moldstad document the fact that audiovisual media are being used extensively in the classroom. New uses are described by Gnizak and Girshman, who have incorporated oral, written, and visual components into the standard high school term paper project, and by Harper and Dwyer, who tested the effectiveness of slides as an aid in teaching German grammar. Dwyer and de Melo conclude the section by drawing attention to the need for assessing the effect of visual testing on visualized instruction.

# VISUAL LITERACY: A MODEL FOR UNDERSTANDING THE DISCIPLINE

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Highly touted, rudely ignored, openly maligned--the concept of visual literacy has spawned the entire range of reactions from educators in its brief history. First identified in the late 1960's, the term "visual literacy" has been variously defined (or left undefined). The concept behind the term encompasses a broad spectrum of factors influencing communication with visual symbols. It is our intention in this paper to first categorize the research literature dealing with visual literacy, and second, to demonstrate how the principles of presentational visual literacy, which is one of the visual literacy categories we will present, are destined to become the growth area for visual literacy.

Because of the great need in our "information society" to communicate increasingly larger amounts of information to more individuals in the most efficient manner possible, the use of visuals to aid communication is a frontier that appears promising but is still uncharted. Research efforts have largely dealt with media only as a vehicle for instruction or communication. Little emphasis has been given to research in which various attributes of media are compared for their effectiveness in accomplishing particular objectives. Knowing the specific attributes of visuals that facilitate the communication process is more important than ever because of the explosion of knowledge now taking place. We, in the field of visual literacy, have need of the conclusions from new, significant research efforts to assist us in the design of communication visuals.

## The Categories of Visual Literacy

From our perspective, the literature dealing with visual literacy falls into three main categories that often overlap. We propose to call these categories theoretical, visual language, and presentational. First, let us explore the theoretical category. There is a body of research literature reflecting philosophical, psychological, and physiological research into various aspects of visual literacy. This literature is the theoretical framework for the visual literacy discipline. We have called literature in this area the theoretical approach. Examinations of numerous elements of the communication process including cognitive styles, mental imagery, hemispheric processes, and eye movements have been reported by many (Dwyer, 1972; 1978; Levie, 1978; Marsh, 1979; Whitley & Moore, 1979; Salomon, 1979; DeBoth & Dominowski, 1978; and Winn, 1977). From these researchers has come information about how a person perceives reality and, in particular, the visual symbols surrounding him.

A second category of research material espouses what may be called the "visual language perspective." This literature is aimed mostly at those who are charged with the task of helping students become "visually literate." Literature concerned with students appreciating art as a symbolic visual medium also may be subsumed under this head. It seems that the predominate perspective of writers in the visual language field of visual literacy is student oriented: teaching students to understand, appreciate, and interact with the visual elements of our society, and helping them express their experiences visually. Hortin (1980, p. 15) suggests that people should be taught to "think and learn in terms of images, i.e., to think visually." Much has been written in this area (Williams, 1978; Cramer, 1976; Fransecky & Debes, 1972; Arnheim, 1969; Greenlaw, 1976; Flynn, 1972; Ausburn & Ausburn, 1978; and Seels, 1979).

Those proponents concerned with the "visual language" area of the discipline have expressed the need they see in terms of programs required "to help students become sophisticated image comsumers and image makers" (Hennis, 1981, p. 79). Some of those who favor an emphasis on helping people become visually literate would agree with O'Rourke (1981, p. 73), who wrote that we should think of visual literacy as a "survival skill necessary in a predominantly visual culture."

Despite the seeming progress that has been made in the visual literacy movement, reports about practical applications of visual literacy research to the communication process have been found in the literature less often than material in the previous two categories. In this paper, we propose a third grouping that is distinguished from the visual language category not because of lack of practicality in that approach, but because of the perspective on which its premises are based. Whereas the visual language advocates focus primarily on the student as the receiver of communication, those representing what might be called the "presentational" category place primary emphasis on the role of the initiator of the communication process--the sender or presenter.

In order to highlight the distinctions we are making among the three categories, a communication model can be used to visually illustrate the perspective of each of the categories. Many communication models exist, from the extremely simple to elaborate diagrams incorporating many elements (Lasswell, 1948; Shannon & Weaver, 1949; Carroll, 1955; Gerbner, 1956; Johnson, 1953; Schramm, 1953; Zelko & Dance, 1965; and Verderber, 1982). Recognizing the danger of oversimplification that exists in using any model, we have chosen the Berlo model (1960) as representing the major elements in the communication process without having undue complexities. It is ideal, in other words, for making clear the distinctions among the three visual literacy categories.

Reducing the Berlo Model (shown in Figure 1) to its four most basic components, source (S), message (M), channel (C), and receiver (R), the difference in perspective between the theoretical, visual language, and presentational categories can be illustrated. Berlo's definition of source (S) and receiver (R) is self explanatory. The definition of the other two components may need further definition. Berlo's definition of message (M) includes content, structure, and coding (encoding by the source and decoding by the receiver). The channel (C) is defined as the sensory functions (sight, hearing, taste, smell, and touch) which allow delivery of the communication.

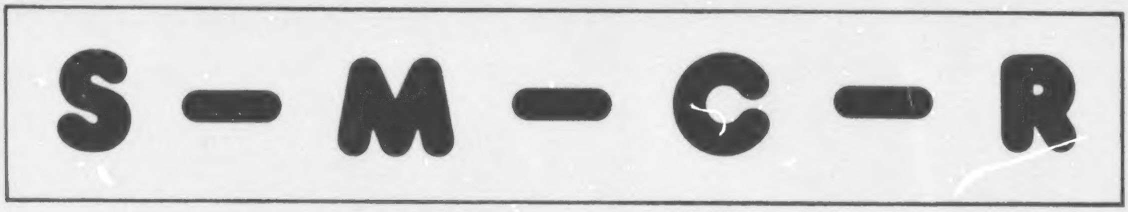


Figure 1. The Berlo model of communication.

The theoretical category of visual literacy literature is illustrated in Figure 2, below. Researchers in this area of the field concentrate heavily upon the receiver (R) and his characteristics, but little emphasis is directly given to how a particular message form is internalized by the viewer.

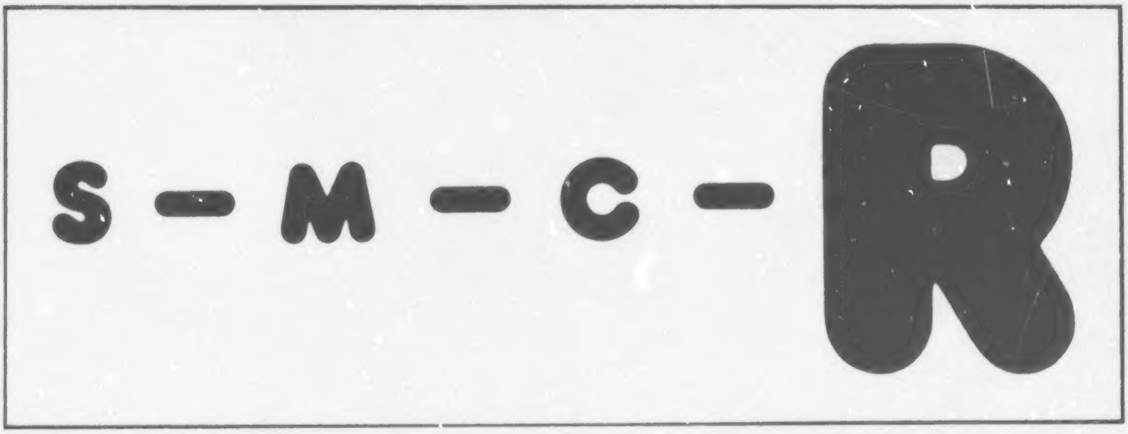


Figure 2. The Berlo model of communication--
theoretical approach to visual literacy.

Figure 3, below, points out the area focused upon by the visual language advocates. They are concerned, in part, with how individuals as receivers of visual stimuli will interpret and respond to the stimuli. In other words, their emphasis is also on the receiver, but specifically on his interaction with the message.

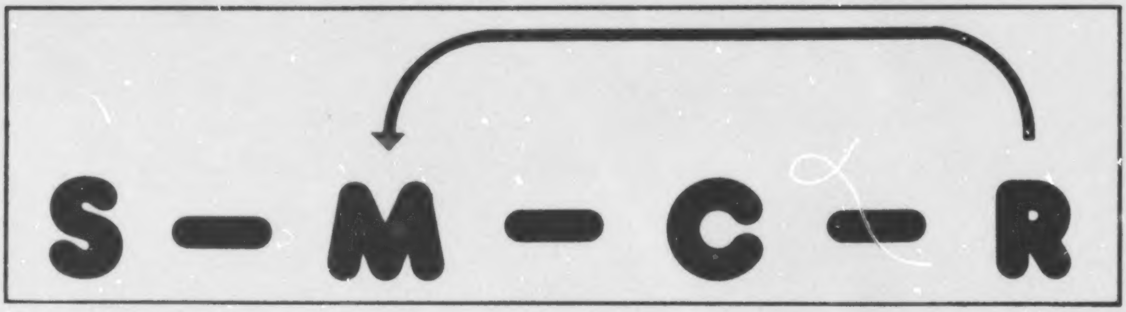


Figure 3. The Berlo model of communication--
*visual language* approach to visual literacy.

Figure 4, below, illustrates that the perspective of the presentational advocates is based on the *source* of the communication process. Those primarily concerned with the presentational aspects of the process place an emphasis on structuring a message so that it will best effect the exchange of information. The visual language and presentational approaches are but different sides of the same coin.

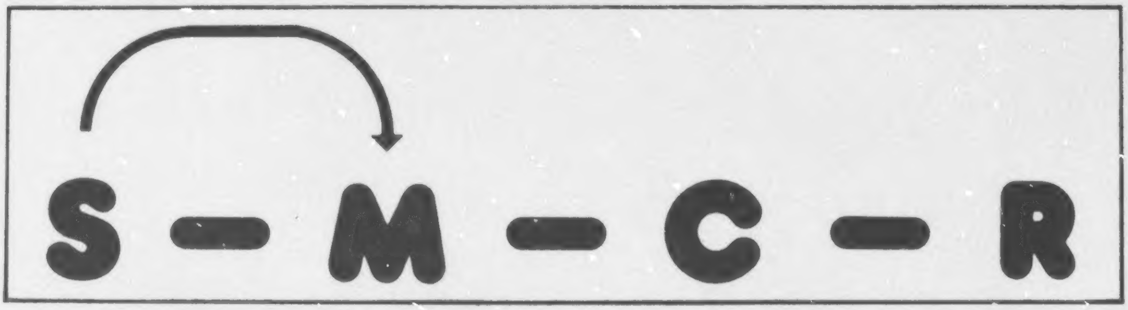


Figure 4. The Berlo model of communication--
*presentational* approach to visual literacy.

The presentational category of visual literacy includes, in general, anyone charged with imparting information through a combination of verbal and visual means. Thus, advertisers (who are concerned about how to best represent their products), business executives, architects, artists, filmmakers, interior designers, and others interested in creating a mood or conveying an idea pictorially must be included in this presentational category in addition to educators and communicators in the traditional sense.

In many ways, practitioners in the area of presentational visual literacy have moved ahead of practitioners in the other categories in exploring and implementing more effective methods of communicating through visualization (see articles in *Journal of Advertising Research*; Dwyer, 1976; Spitzer & McNerny, 1975; Oxford & Moore, 1979; Griffin & Butt, 1980). These writers have identified the need for further study in the area of presentational visualization. Researchers and practitioners alike need to follow the lead of those who are pursuing fertile directions in the challenge to improve communication from the presenter's perspective.

The three visual literacy perspectives we have identified are summarized below:

Table 1

Summary Table of Visual Literacy

| Category | Description | Representatives |
|---|---|---|
| Theoretical | incorporates the philosophical, psychological, and physiological aspects of learning | Dwyer, Levie, Marsh, Whitley and Moore, Salomon, DeBoth and Dominowski, Winn |
| Visual Language | committed to helping people become visually literate by effectively relating to visual stimuli; receiver oriented | Williams, Cramer, Fransecky and Debes, Arnheim, Greenlaw, Flynn, Ausburn and Ausburn, Seels |
| Presentational | concerned with improving the communication process through design of visual stimuli; presenter-oriented | Dwyer, Spitzer and McNerny, Oxford and Moore, Griffin and Butt |

## Why the Presentational Perspective is Needed

Since scientists, futurists, and educators alike have noted that we are living in an increasingly visual age, the challenge of the 80's for visual literacy advocates is to define some general principles that can be used by designers, instructors, and presenters to facilitate more effective visual communication. "Sesame Street" and Golden Books only represent a beginning point for a child's interaction with educationally related visuals. The presence of a television in at least 97% of the homes in America is a major factor accounting for the need to help people interpret and interact with the bombardment of visual symbols they experience in today's society.

Many writers have said that the proliferation of information and technology in our age has begun to make obsolete the forms of communication which use only the oral or written media. Because patterns of communication in almost every sphere of life have taken on a strongly visual emphasis, the need is acute for teaching and learning about 1) the methods of, 2) the rationale behind, and 3) the importance for visual communication in terms of the presenter.

Because this is a relatively new field of educational investigation, efforts to meet this need have proceeded slowly and sporadically. When visual literacy was first identified, a broad base of research had not been built to substantiate the validity of visual communications, but researchers did recognize that visuals should play some part in their instructional communication. For this reason, non-verbal supports were added to existing oral and written materials that were intended to capture the student's attention and add new sparkle to the lessons. Visuals were, so to speak, icing on the communication cake.

However, as research efforts increase, it is apparent that visualizing is a more important consideration for effective communication than was once thought. No longer can visual images be regarded as frills added for affective impact. There has been a radical reversal in communication modes as visual images begin to outnumber the verbal and written stimuli so that some would even say, "words have become decorative accessories so far as the sharing of essential ideas is concerned" (Feldman, 1976, p. 199). Admittedly, this is a radical perspective, but the educational implications are evident. It has been observed that students involved in various kinds of visual literacy projects have begun to see connections between verbal language elements and their counterparts in the visual language (Fransecky & Debes, 1972). Though research points to the fact that visualization does not always produce increased effectiveness (Dwyer, 1972), in many instances, integrating the visual with the oral or written message is helping students grow in both their discriminatory and evaluative skills (Cramer, 1976) as well as in making communication within a visually oriented world easier and more productive.

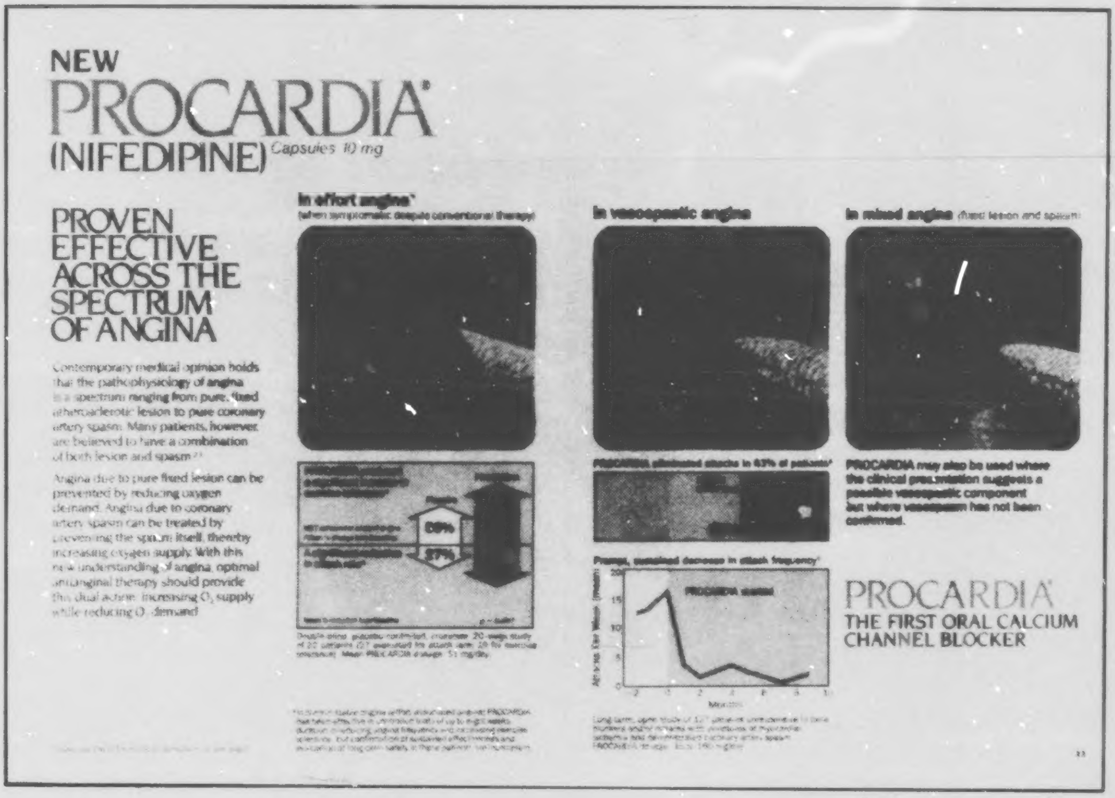
Despite scoffers, visual literacy is a necessary foundation block of the communication design process. However, in order to survive as a viable entity, practitioners must become more aware of and take advantage of the discipline's diverse nature and scope. Furthermore, those representing the various elements within the discipline must work together toward common objectives.

The following examples illustrate the fact that many instructional designers seem to lack an understanding of research and the best ways to apply research to the design of instructional visuals. The first example reveals an ignorance of or lack of adherence to principles derived from visual literacy research. Nevertheless, the result is a high quality product that serves the designer's purpose well. The second illustration fails to accomplish the desired results despite the fact that it was created in accord with well-documented research principles.

## An Advertising Example

The advertising profession depends heavily upon the principles of visual literacy because much of the advertiser's work involves combining visual images with written text or oral commentary.

Figure 5 (Pfizer, Inc., 1982) shows portions of a medical advertisement which has appeared in recent journals targeted to physicians. The advertisement promotes a product, "Procardia," produced by Pfizer Laboratories to control angina pectoris.



NEW
PROCARDIA®
(NIFEDIPINE) Capsules 10 mg

PROVEN EFFECTIVE ACROSS THE SPECTRUM OF ANGINA

Contemporary medical opinion holds that the pathophysiology of angina is a spectrum ranging from pure, fixed atherosclerotic lesion to pure coronary artery spasm. Many patients, however, are believed to have a combination of both lesion and spasm.[2,3]

Angina due to pure fixed lesion can be prevented by reducing oxygen demand. Angina due to coronary artery spasm can be treated by preventing the spasm itself, thereby increasing oxygen supply. With this new understanding of angina, optimal antianginal therapy should provide this dual action: increasing $O_2$ supply while reducing $O_2$ demand.

In effort angina*
In vasospastic angina
In mixed angina (fixed lesion and spasm)
69%
37%
PROCARDIA eliminated attacks in 63% of patients
Prompt, sustained decrease in attack frequency
PROCARDIA started
Months

PROCARDIA may also be used where the clinical presentation suggests a possible vasospastic component but where vasospasm has not been confirmed.

PROCARDIA®
THE FIRST ORAL CALCIUM CHANNEL BLOCKER

Figure 5. An advertising example.

The Procardia advertisement displays rich and colorful realistic paintings of the human heart, blood vessels, and surrounding tissues. These renderings approach the quality of photographs in their accuracy and detail in depicting actual human physical conditions. As art, the paintings attain a level of professional excellence.

If this advertisement, and other visuals similar to it, were critiqued by instructional designers using the prevailing

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principles of instructional research, great changes would probably be suggested. First, much visual literacy research propounds the view that realistic drawings, such as the Procardia advertisement, do not improve the comprehension of the message. Second, instructional designers used to working within limited budgets would dismiss this level of art as being far too costly in terms of instructional efficiency.

Surprisingly, however, the Procardia advertisement, as an example of presentational visual literacy, is effective. Even though it has defied well recognized principles of visual research, the advertisement is accomplishing its objective--informing physicians of the benefits of this pharmaceutical product. Since the ad has been running with only minor changes for two years, the advertisement can be judged successful.

The most obvious explanation for the effectiveness of this Pfizer advertisement is its appropriateness for the intended audience of physicians. To the lay person, the paintings seem very complex and detailed. Actually, they are relatively simple when viewed from the physician's perspective. The paintings have isolated the heart and the affected vessels from the context of interrelated organs which brings a degree of simplicity to the advertisement. Thus, the principle of "simplicity in visual illustration" must be measured against the characteristics of the intended audience. The Pfizer advertisement, then, despite its violations of the general visual literacy research findings, is effective because of the appeal to and relevance for the intended audience.

## A Computer Example

Instructional visuals are found most often in school settings, but they are not always effective, especially as they are being utilized in the growing field of computer assisted instruction. Figure 6 shows a misuse of the principles of visual literacy in communication. This illustration comes from a science series produced by the Minnesota Educational Computing Consortium (M.E.C.C.) (Brumbaugh & Crist, n. d.), producers of much educational software for computer based instruction. The diagram of the fish is intended to be generic, since the lesson deals with the circulatory system of creatures with two-chambered hearts, such as the fish.

The computer-drawn visual of the fish and its internal organs is done in angular, block style and is, therefore, oversimplified to the point of being distorted. It resembles a drawing from the Cubist school of art rather than a biological form. After viewing the drawing for a few minutes (enough time to complete the lessons), the visual becomes a mass of blocks without any real definition. Internal organs, since they are all alike except for relative size, cannot be easily distinguished from each other or from the circulatory system of the fish. Junior high students, for whom this was designed, will be shocked when they discover through dissection that a fish is not nearly as simple as the drawing suggests. As an instructional visual designed to teach a concept in biology, the illustration fails miserably, even though the designers held to the axiom of "simplicity in visual illustrations."

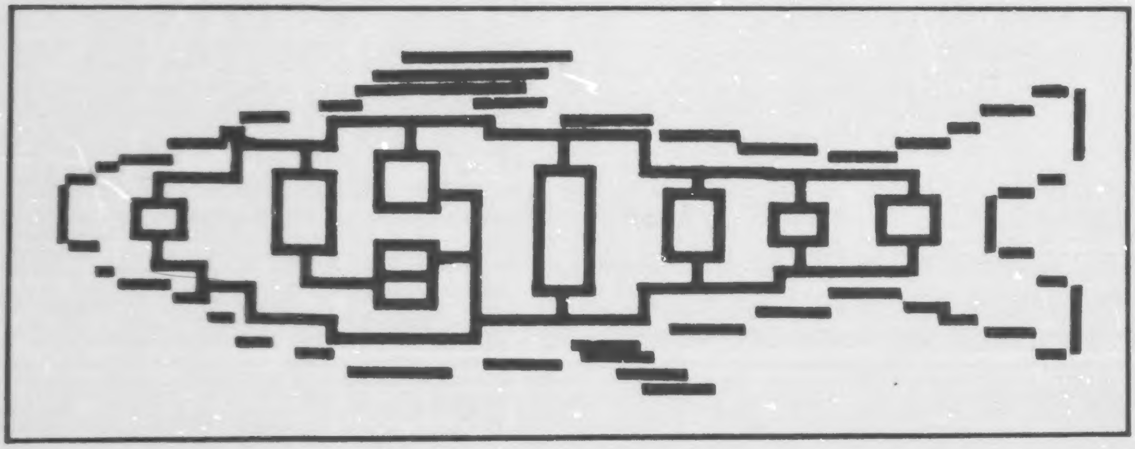

Figure 6. A computer graphic example.

The problem this illustration points out has to do with who assumes the role of visual designer. In the case of the M.E.C.C. courseware illustration, it is possible that the ideas of the instructional designer were not well-communicated to or carried out by either the programmer or the computer itself. The function of the instructional designer has thus been passed to those whose knowledge of the principles of presentational visual literacy is limited.

As computers become relied upon more heavily as instructional tools, the concept of computer graphics takes on increased significance. The computer is opening the door to practical design and production of visual materials. The process of producing visuals, until now, was clumsy at best and difficult for all except artists. The technology is rapidly becoming available that will enable *anyone* to create high-quality visuals for almost any instructional setting. Thus, the area of computer produced and/or delivered visual materials is another frontier toward which researchers should begin directing their attention.

## Conclusion and Recommendations

We have identified three categories or directions pursued by those seeking to incorporate the concept of visual literacy into various instructional settings. The field of visual literacy has been arbitrarily subdivided into these categories based upon how the literature reflects the distinct perspectives of various authors: theoretical, visual language, and presentational.

The connection between current visual literacy research principles and the design of visuals for instructional presentation was demonstrated by two examples, one from the realm of medical advertising and one from computer courseware. The effectiveness of each visual for its intended audience was set forth, as well as reasons for its appropriateness.

The diversity of visuals used in presentations stems from the influence of two contributing factors: established research and the acute need to communicate successfully. Designers have applied visual literacy principles derived from research in presentational settings with some success. However, because we have only begun to scratch the surface with our research, an area that needs more attention is that of how people learn from visual materials.

The principles involved in the design of *most* visuals for presentational settings have been based on pragmatic foundations (what has worked before) instead of on sound, research-based principles, partly because very little research of this type exists. In other words, if a particular type or style of visual has been well-received by an audience, its use is continued without much reference to what established research efforts have either advocated or decried.

We believe that the theoretical must, if it is to be useful, give rise to practical applications, and innovations by practitioners need to be the subject of further research by theorists. The struggling efforts of those concerned with designing effective visuals should be the catalyst that fosters new explorations into ways to utilize visuals in order to maximize instructional effort. Thus, we encourage follow-up research along the lines suggested by the practical examples presented herein.

In addition, we recommend that educators and communicators take every available opportunity to teach those who have a part in designing visual instructional materials what is presently known about the discipline of visual literacy. It is important that communicators design visuals based upon the most thorough understanding of the discipline as possible. Not only will this serve to produce better visuals in every instructional setting, but the concepts we now cling to can be tested in practical applications.

We therefore strongly recommend that researchers seek to validate what communicators have found to work and that communicators make practical application of the principles derived by co-workers in the theoretical sphere. If this process is followed, we believe the discipline of visual literacy will not only survive, but gain more credibility and stature among educators as a valid and necessary concept.

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# AN ANALYSIS OF VISUAL RECRUITMENT MATERIALS USED IN HIGHER EDUCATION

by

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## Introduction

Increases in growth and size or 'bigger and better' have long been hallmarks of progress in America, and by these standards, higher education has been a resounding success. Student enrollment figures for the past 25 years have climbed to record levels. For example, in the decade of the sixties, total undergraduate enrollment in the U. S. doubled to four million and total undergraduate and graduate enrollment rose to over eight million (Centra, 1980).

Predictions of dramatic decreases in enrollment permeate the journals in higher education today, despite the large gains in enrollment made during the 1960's and 1970's. There is even fear that many programs and some colleges and universities will be abolished as a result. The Carnegie Council on Policy Studies in Higher Education reports that in the next two decades higher education will witness declines in enrollment from 5 to 15 percent (Scully, 1980). The problems will be serious enough to threaten the survival of some colleges and universities and the quality and integrity of others. Crossland (1980) of the Ford Foundation predicted that there would be a one to two percent annual decline in enrollment, between 1982 and the mid-1990's. In other words, he believes there will be approximately 150,000 to 175,000 fewer college students per year between 1982 and 1996.

These figures indicate that the 1960's and 1970's were successful years for most colleges and universities in terms of enrolling record numbers of students. However, the individual programs within institutions of higher education varied in their enrollments. The three programs of interest in this study, Home Economics Education, Business and Foods, and Nutrition and Dietetics, experienced varying degrees of success during this period. The first program area, Home Economics Education, was selected because of documented decreases in enrollment since the 1970's. The other two program areas were chosen for comparison because of documented increases in enrollment during the same period.

The measures that institutions of higher education can and are implementing to ward off the predicted declines in student enrollment are of major importance. According to Hoffman (1980) there are a number of strategies colleges and universities could implement to assist in maintaining enrollment levels in the coming decade. First, colleges must be certain about their purpose and articulate this clearly to prospective students. And second, they must speak convincingly of the value of their programs to targeted student populations. Nontraditional students have been targeted by colleges and universities to help combat enrollment declines during the 1980's (Centra, 1980). Adults, women, part-time students, and minorities are the frequently mentioned categories.

O'Keefe (1977) mentions that the traditional full-time 18 to 21-year-old college student may delay his or her college enrollment until later years and then participate on a part-time basis. Magarrell (1981) presents support for this claim when he states that part-time students accounted for 42 percent of the total college enrollment in 1981. Printed recruitment materials are commonly sent by colleges and universities to articulate their purposes to prospective students. We believe that both the verbal and visual characteristics of these materials impact upon a student's ultimate decision. Further, we believe the nature of the response sent to prospective students, the response time, and the academic position of respondents need to be explored as important variables in the recruitment process.

This study was undertaken to describe and compare the cost and types of visual recruitment materials being sent to prospective students in the areas of Home Economics Education, Foods, Nutrition and Dietetics, and Business.

## Illustrated Recruitment Materials

Posters, brochures, catalogs, information sheets, and booklets are commonly utilized recruitment materials. These are typically sent by departments, schools, or colleges when a prospective student requests program information. In many cases these materials will be the only media for forming an opinion concerning a particular program, campus, and geographic location. Of particular interest here is the nature of the design and visual impact of these materials, particularly illustrated materials.

Most recruitment materials contain a combination of text and photos or line art. Duchastel (1981) states that illustrations in text can play three roles: 1) attentional, 2) explicative, and 3) retentional purposes. Attentional illustrations keep the reader's interest and make reading enjoyable. Explicable illustrations, such as scientific diagrams, involve facts and details. Retentional illustrations serve as memory retrieval cues after the text has been read.

Levin's (1979) approach to categorizing illustrations in text involves eight increasingly complex cognitive processes: decoration, remuneration, motivation, reiteration, representation, organization, interpretation, and transformation. His first three categories (decoration, remuneration, and motivation) are similar in purpose to Duchastel's attentional illustration. These illustrations serve marketing and attention-getting roles, rather than educational roles. Many of the illustrations presented in recruitment materials serve this purpose. The goal may be to present pleasing illustrations which will generate interest in attending the institution rather than stimulating long term memory of facts or details.

The psychological literature on cue salience and attention-getting properties of cues lends insight into effectively designing and presenting illustrated recruitment materials. Trabasso and Bower (1968) list the following procedures for manipulating the cue salience of visual messages in order to increase their attentive values. First, they suggest utilizing more abstract, less detailed, and less realistic illustrations through increased use of line art rather than photographs. Second, they suggest using greater contrast between distinguishable characteristics. Using a black and white rather than light grey and dark grey presentation may increase the attention-getting power of a particular material. And third, they suggest adding more of cue to a stimulus pattern by adding more of a particular color, adding more contrast between colors, or picturing three-dimensional rather than two-dimensional objects. Making an important object "larger than life" can increase its attention-getting properties. Discriminations are made easier by increasing the colored area of a pattern or using completely filled versus half-filled geometric configurations.

From this review of literature it appears that programs of higher education, and particularly Home Economics Education, must more actively recruit students from targeted audiences. They can effectively do this by paying attention to design principles in illustrated recruitment materials, and the nature of responses to requests from prospective students.

## Research Questions

The following research questions were addressed in this study: 1) What types of recruitment materials are being sent to prospective students from the three identified program areas at all three levels? 2) How do the three program areas compare in the cost of recruitment materials being disseminated by level? 3) What individuals are being portrayed in illustrated recruitment materials from all three program areas at all three levels?

## Sample

Three sources were consulted; they confirmed that a total of 32 institutions in the continental United States offer bachelors, masters and doctoral degrees in Home Economics Education. These sources were: the 1982 directory of the National Association of Vocational Home Economics Teacher Educators, and Harper report (1981). Separate requests were sent to each of three program areas (Home Economics Education; Business; and Foods, Nutrition and Dietetics) at the 32 colleges and universities asking for sample recruitment materials/information at the bachelors, masters, and doctoral levels. The names of the appropriate respondents in each of the three areas within each of the 32 institutions were identified by consulting college catalogs, and college brochures. Each respondent received a personal letter asking for sample materials. This afforded a sample of 288 possible responses and 1,152 pieces of recruitment materials.

## Procedure

Personalized letters were sent to the identified contact persons in each of the areas of Home Economics Education; Business; and Foods, Nutrition and Dietetics at the same 32 institutions requesting sample recruitment materials/information at the bachelors, masters and doctoral levels. Follow-up postcards were sent 18 days after the initial request. After the fourth week, telephone calls were placed to the remaining nonrespondents. Recruitment materials received were categorized by the authors according to predetermined and emerging categories. The authors hypothesized that seven types of recruitment materials would be received during the course of this study: applications for enrollment, booklets, brochures, catalogs, information sheets, letters, and posters. Four of these emerged as the dominant types of recruitment materials currently being disseminated: booklets, brochures, information sheets, and letters. A total of 158 information sheets, 215 booklets, 177 letters, and 203 brochures were received or a total of 753 pieces of material. One poster and 3 catalogs were received.

Two hundred and eighty-eight of the 753 materials contained illustrations. One hundred and twenty-three of these illustrated materials were randomly selected by the authors and individually analyzed and rated by a graphic artist according to cost and design characteristics. The graphic artist categorized each of the pieces as inexpensive, moderate, or expensive based on the number of different colors used, the quality and texture of the paper, numbers of drawings and/or photographs, and graphic details such as gold embossing, dye-cuts and bleeds. The materials were categorized by the authors for: 1) length of response time, 2) academic position of respondent, and 3) the types of individuals portrayed in illustrations. The categories for academic position of respondent were faculty member/department chairperson, administrator, or unidentified. The categories for individuals portrayed in the illustrations were based on gender, race, and nontraditional status. Nontraditional students were defined as older and handicapped.

## Data Analysis

Data were analyzed using log-linear modeling procedures for categorical data (Kennedy, 1983). The explanatory variables were the three program areas and the three levels. The response variables were types of recruitment materials being disseminated, cost of recruitment materials, and numbers of types of individuals portrayed in illustrated recruitment materials.

## Findings

In question one the following was asked: What types of recruitment materials are being disseminated by the three program areas at all three levels? The categories for this analysis were brochures, information sheets, letters, and booklets. A significant effect was found for brochures, information sheets, and booklets by area (LRx2 = 16.46,DF=2, p<.001; LRx2 = 12.47, DF=2, p=.002 and LRx2 = 9.74, DF=2, p=.007, respectively). Table 1 reveals that Home Economics Education sent less than expected numbers of brochures (.58) and more than expected booklets (.66). Foods, Nutrition and Dietetics sent less than expected numbers of information sheets (.41). See Table 1 for a summary of significant effects for types of materials received in this study.

Table 1

Conditional Proportions of Types of Materials by Area

| Area | Material | | |
|---|---|---|---|
| | Brochures (203) | In. Sheets (158) | Booklet (215) |
| Home Ec. Ed. | .58 (-)*** | .58 | .85 (+)** |
| Business | .84 (+)*** | .66 (+)** | .66 (-)* |
| Foods | .70 | .41 (-)** | .72 |

* = p < .05
** = p < .01
*** = p < .001

In question two the authors examined how the three program areas compared in the cost of the materials being sent to prospective students at the bachelors, masters, and doctoral levels. A graphic artist categorized the 123 randomly selected illustrated materials as inexpensive, moderate, and expensive. No significant effects were found for the cost of the materials by program area or level.

In question three the authors compared the three programs in the types of individuals portrayed in illustrated recruitment materials at all three levels. The groups of interest were males/females, minorities, and nontraditional students (e.g., older and handicapped individuals). A significant effect was found for numbers of males and females portrayed by area (LRx2 = 15.67, DF=4, p<.004). The categories were defined as male dominant or more males than females portrayed in a single recruitment material, female dominant or more females than males in a recruitment material, and approximately equal numbers of males and females portrayed in a single recruitment material.

Business, and Foods, Nutrition and Dietetics revealed approximately equal and opposite effects in this area. Business materials portrayed significantly more males (.61) and less females (.03). Foods, Nutrition and Dietetics materials portrayed significantly more females (.50) and less males (.27). Table 2 summarizes the significant effects for the types of individuals portrayed in recruitment materials.

Table 2

Conditional Proportions of Gender Represented by Area

| Area | Dominant Gender | | | | |
|---|---|---|---|---|---|
| | N | Male | Female | Equal | |
| Home Ec. Ed. | 23 | .39 | .30 | .30 | 1.00 |
| Business | 33 | .62 (+)* | .03 (-)*** | .36 | 1.00 |
| Foods | 30 | .27 (-)* | .50 (+)** | .23 | 1.00 |
| Total | 86 | | | | |

* = p < .05
** = p < .01
*** = p < .001

## Summary of Findings

A comparison of the types of materials being disseminated by the three program areas at all three levels seemed to point out that Home Economics Education is sending significantly more booklets, while Business is sending more brochures and information sheets.

The investigators also compared the cost of the materials received by program area and level. No significant differences were found in cost of materials by area or level.

The analysis of the types of individuals portrayed in illustrated recruitment materials yielded no differences in materials designated for the bachelors, masters, and doctoral levels. However, Business materials contain significantly more pictures of males; while Foods, Nutrition, and Dietetics materials contain more pictures of females.

## Conclusions

The following conclusions and recommendations are made based on the findings in this study. First, the scope of this study should be expanded to include other program areas such as those that are currently experiencing rapid growth in enrollment (Engineering and Computer Science), that traditionally have been occupied by one gender (Nursing and Agricultural Education) and that make up other areas within home economics (Fashion Merchandising and Human Development and Family Relations).

Second, additional studies need to be conducted on the aesthetic preferences and resulting decision making processes of students from varying targeted audiences when presented with sample recruitment materials. These materials could vary in design, format, color, and content.

Third, the data from this study needs to be re-analyzed to determine the numbers and types of materials designed for individual program area distribution versus materials designed for university or college-wide distribution. The authors found that many program areas disseminate university-produced materials with information of a broader nature. Other areas distribute a combination of their own materials and university-produced materials. When program areas design and distribute their own materials they are able to present specific program information and requirements. However, it needs to be determined how prospective students respond to receiving materials promoting the college or university versus the particular program area. If it can be shown that one approach is significantly more effective in recruiting students, resources can be allocated accordingly.

The findings indicate a number of pertinent questions still to be answered if Home Economics is to mount an effective campaign to recruit students in the coming decade. *First, what criteria are used in determining whether to send prospective students booklets, information sheets, or brochures?* Since booklets are larger and more expensive to produce and mail than brochures and information sheets, the decision should be based on evidence of the superior effectiveness of one type or a combination of types of materials. Do students respond more favorably to one particular type of material or are their responses based more on aesthetically pleasing and attention-getting visual design? Are there other more creative media, such as audio tapes, conference calls, computer discs, and posters, which are more effective in recruiting nontraditional students?

*Second, are the individuals portrayed in illustrated recruitment materials representative of new and emerging audiences in higher education?* New audiences in higher education include adults, women, minorities, transfer students from two-year colleges, and foreign students. In this study few older, minority, foreign, or handicapped students were found to be pictured in any of the recruitment materials. However, there are significant differences in gender representations by program area. Business materials portray significantly more males. This is due to the fact that Business materials typically contain large numbers of pictures of faculty members. The majority of faculty members in the Business area are male. A related area of research would be to explore the effectiveness of picturing faculty members versus students in recruitment materials.

*Third, is it effective for prospective bachelors, masters and doctoral students to receive the same types, and numbers of recruitment materials?* There are no significant differences in the numbers, types or quality of recruitment materials being sent to prospective bachelors, masters, and doctoral students. Given the different ages, interests, and prior experiences of undergraduate and graduate students, it may be wise to design specific materials for specific audiences, particularly nontraditional audiences.

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# PICTURE LEGIBILITY, READABILITY, AND READING VALUE

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## 1. *Reading pictures*

We learn to read words and we also have to learn to "read" pictures. Thus, it is important for the visual language in all media to be tailored to provide a gradually increasing degree of difficulty.

It is reasonable to make the following assumptions:

-- A picture that is easy to read should convey the relevant information more readily and effectively than a picture which is difficult to read.
-- A picture that you like should convey information more readily and effectively than a picture that you don't like - when motivation is the same in both cases.
-- A "poor" picture may work when motivation is high, but a "good" picture should then work even better.

In view of our understanding of the importance of the way a picture is executed with respect to different variables in the visual language, the author has devised a proposal for a measure of a picture's readability, i.e. a *picture readability index* (BLIX, an acronym for this term in Swedish). BLIX values may range from 0, i.e. a virtually incomprehensible picture, to 5, i.e. a very comprehensible picture, and was initially calculated on the basis of the rating of up to 19 variables that researchers had found important in instructional message design (see "References"). When the research started in 1980, 17 variables were directly related to the *content* and *execution* of the visual and 2 to the *context*. The 17 variables were: 1. external shape, 2. external contour, 3. size, 4. color versus black and white, 5. color intensity, 6. contrast, 7. gray scale and darkness-lightness, 8. degree of realism, 9. number of details, 10. number of centers of interests, 11. location of center of interest, 12. presence of symbols and reading aids, 13. perspective, 14. illusions, 15. subject common or uncommon, 16. size of main subject and 17. technical quality. The remaining 2 variables were: 18. legend, and 19. relationship between legend and picture. The BLIX-test was constructed in such a way that different kinds of pictures could be indexed. Relations between different pictures of layout were not taken into account in the first stage.

In the spring of 1981, a number of experiments were conducted in which six pictures of the same subject and containing the same basic information (a blue titmouse perched on a branch) were used. The pictures were drawn according to detailed specifications and were designed to cover the entire "picture readability scale" (Figure 1).

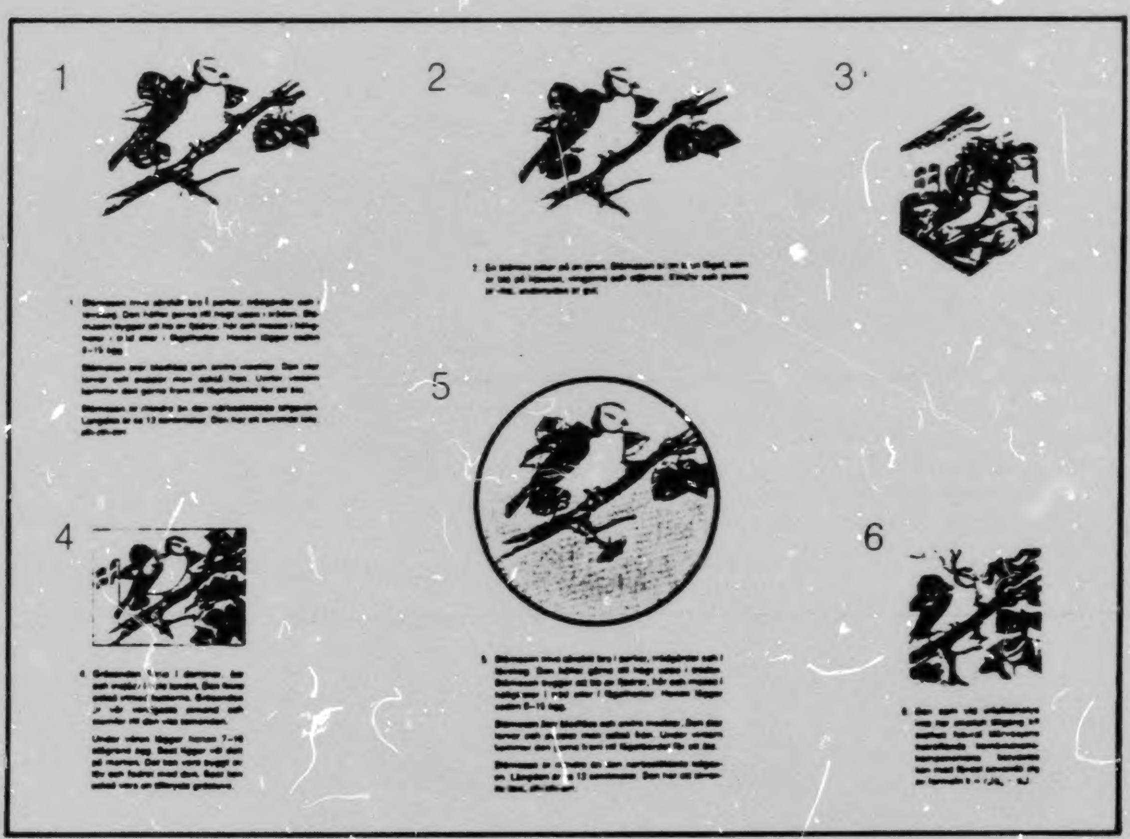

Figure 1. Visuals used in ranking and rating experiments, here greatly reduced in size and not in color. Intended BLIX ratings 1=4, 2=5, 3=0, 4=2, 5=3, and 6=1.

### 1.1 Ranking

In one experiment 9-12 year old subjects in Sweden had to rank the pictures "with a view to their ability to convey information on what a blue titmouse looks like." The mean rates of the rankings corresponded to the intended ranking of the test pictures and were statistically significant. More than 85% of the subjects rated pictures with BLIX values of 5 and 4 as "best" or "next best" of the six alternatives. Ninety percent of the subjects ranked the test picture with the lowest BLIX value as "worst" or "next worst" (Table 1).

### 1.2 Rating

In another experiment adult subjects, teachers, and editors of textbooks ranked the same test pictures in the same way as mentioned above. The subjects also rated the pictures according

Table 1

The rankings (%) by children in Sweden of the pictures made in six different ways with the subject "blue titmouse perched on a branch."

| Test pictures intended BLIX values | Rank order of mean values | Mean values of rankings | Ranking of visuals in % | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | r1 | r2 | r3 | r4 | r5 | r6 |
| 5 | 1 | 1.5 | 75 | 13 | 5 | 2 | 3 | 1 |
| 4 | 2 | 2.0 | 20 | 67 | 8 | 1 | 2 | 1 |
| 3 | 3 | 3.4 | 2 | 13 | 56 | 15 | 2 | 13 |
| 2 | 4 | 4.1 | 1 | 3 | 13 | 59 | 14 | 9 |
| 1 | 5 | 4.5 | 1 | 1 | 16 | 17 | 54 | 10 |
| 0 | 6 | 5.5 | 1 | 2 | 1 | 5 | 24 | 66 |

n = 170 children

to their assessments of the pictures' suitability for use in the teaching of 9 to 12-year olds. Even here the mean ranking of the test pictures corresponded to their intended ranking. Pictures with a BLIX rating of 5, 4, and 3 respectively were rated as "very suitable" or "suitable" for use in teaching. Pictures with a BLIX rating of 2, 1, or 0 were rated as "unsuitable" or "very unsuitable" (Table 2).

Table 2

The ranking and rating by adults in Sweden of a picture of a "blue titmouse perched on a branch" in six different versions.

| Test pictures intended BLIX values | Mean values of rankings | Rating of visuals (in %) | | | | |
|---|---|---|---|---|---|---|
| | | Very unsuitable | Unsuitable | Neither suitable nor unsuitable | Suitable | Very suitable |
| 5 | 1.0 | | | | 10 | 90 |
| 4 | 2.0 | | | | 45 | 55 |
| 3 | 3.0 | | | 20 | 75 | 5 |
| 2 | 4.5 | 55 | 35 | 10 | | |
| 1 | 4.6 | 55 | 45 | | | |
| 0 | 5.0 | 95 | | 5 | | |

n = 20 adults

The rating experiment has been repeated several times on individual adult subjects and always with the same general result so far.

## 2. Making pictures

During the fall of 1981, 19 students majoring in design at the School of Applied Arts, Goteborg University, Sweden, participated in a picture production experiment. The students were assigned the task of making pictures which could be used in a secondary school textbook to illustrate the appearance of an edible boletus (a spore mushroom). The subjects were supplied with a true-to-life, life-size plastic model of the mushroom and with verbal information on the characteristic features of this fungus which distinguish it from other mushrooms. They were given instructions about content and execution, with a view to the 19 different picture variables. The work resulted in 26 pictures, all assigned "identity numbers," which were then used in all further steps (See Figure 2). Groups of experts rated the esthetic values of the resulting pictures and their usefulness in teaching. Their BLIX values were also calculated (Table 3).

Table 3

BLIX rating, esthetic value and usefulness in teaching of 26 pictures.

| Group | Rank | BLIX Rating | Picture No. | Esthetic value ratings by experts[1] 1 | 2 | 3 | 4 | 5 | Usefulness ratings by experts[2] 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1: students who followed the instructions | 1 | 4.8 | 17 | | | | 1 | 4 | | | 1 | | 4 |
| | 2 | 4.5 | 10 | | 1 | 1 | 2 | 1 | | | 1 | 3 | 1 |
| | 3 | 4.4 | 8 | | 1 | | 1 | 3 | 1 | 1 | 2 | | 1 |
| | 4 | 4.4 | 9 | | | 2 | 2 | 1 | | 1 | 2 | 2 | |
| | 5 | 4.3 | 21 | | 2 | 2 | 1 | | | 2 | 2 | 1 | |
| | 6 | 4.2 | 26 | 1 | 3 | 1 | | | | | 3 | 2 | |
| | 7 | 4.1 | 12 | | 2 | 2 | 1 | | | 2 | 1 | | 2 |
| | 8 | 4.1 | 22 | | 2 | 2 | 1 | | | | 2 | 2 | 1 |
| | 9 | 4.1 | 3 | | | 1 | 4 | | | | | 1 | 4 |
| | 10 | 4.1 | 25 | | 2 | 2 | 1 | | | | 2 | 3 | |
| | 11 | 4.1 | 11 | | 1 | 1 | 1 | 1 | | 3 | 1 | 1 | |
| | 12 | 3.9 | 24 | | 2 | 2 | 1 | | | | 2 | 2 | 1 |
| | 13 | 3.8 | 13 | | 1 | 2 | 2 | | | 1 | | 3 | 1 |
| | 14 | 3.8 | 16 | | 1 | 2 | 1 | | | 2 | 1 | 2 | |
| | 15 | 3.8 | 14 | | | 2 | 3 | | | 3 | 1 | 1 | |
| | 16 | 3.8 | 15 | | 1 | 3 | 1 | | | 3 | 1 | 1 | |
| | 17 | 3.8 | 19 | 4 | 1 | | | | | 4 | 1 | | |
| 2: students who did not follow the instructions | 18 | 3.7 | 20 | | 3 | 2 | | | 1 | 3 | 1 | | |
| | 19 | 3.6 | 2 | | 1 | 3 | 1 | | 2 | | 3 | | |
| | 20 | 3.4 | 7 | | | 2 | 3 | | | 4 | 1 | | |
| | 21 | 3.4 | 4 | 1 | 3 | 1 | | | 4 | 1 | | | |
| | 22 | 3.4 | 1 | | 2 | 3 | | | 5 | | | | |
| | 23 | 3.4 | 18 | 2 | 1 | 2 | | | 4 | 1 | | | |
| | 24 | 3.1 | 5 | 1 | 1 | 1 | 2 | | 1 | 1 | 3 | | |
| | 25 | 2.7 | 23 | 1 | 3 | 1 | | | 5 | | | | |
| | 26 | 2.5 | 6 | 5 | | | | | 5 | | | | |

n = 26 pictures

1) 1 = very poor
2 = poor
3 = neither poor nor good
4 = good
5 = very good

2) 1 = very unsuitable
2 = unsuitable
3 = neither unsuitable nor suitable
4 = suitable
5 = very suitable

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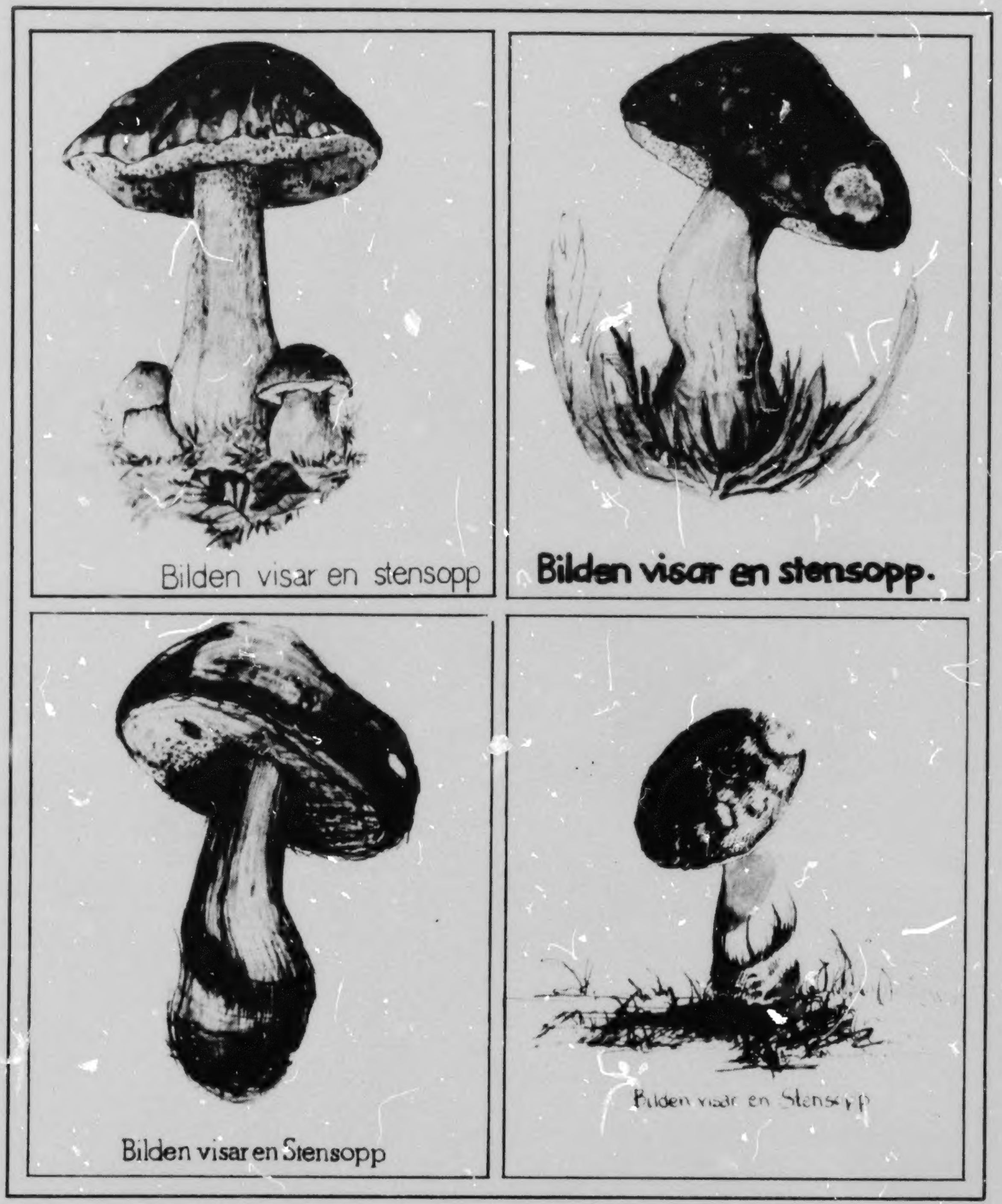
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Figure 2. Four of the visuals produced by the students, here much reduced and not in color. Rankings 1, 2, 25, and 26 (see Table 3).

Students who had followed the instructions drew pictures (17) with BLIX values ranging from 3.8 to 4.8 (mean value = 4.1). The students who had not followed the instructions drew pictures (9) with BLIX values ranging from 2.5 to 3.7 (mean value = 3.6).

An analysis of the material disclosed the following:

1. Despite the detailed instructions regarding the execution of pictures, there was still scope for individual creativity.
2. Informative pictures made so that they had high BLIX values (more than 4.5)
   a. were rated to a large degree (80%) as "good" or "very good" from an esthetic point of view (Table 4);
   b. were rated to a large degree (80%) as "suitable" or "very suitable" for use in teaching (Table 5);
   c. need not take longer to produce (and thus cost more) than pictures with lower BLIX values (Table 6).
3. Informative pictures produced so that they had low BLIX values (less than 3.0)
   a. were rated to a large degree (90%) as "poor" or "very poor" from an esthetic point of view (Table 4);
   b. were rated to a high degree (100%) as "unsuitable" or "very unsuitable" for use in teaching (Table 5).
4. The instructions should be followed to ensure reliable and good results (Table 3).
5. Picture readability is positively correlated with both the esthetic rating and usefulness in teaching. The esthetic rating and assessed usefulness in school were also strongly correlated, i.e., a picture which was esthetically pleasing was generally considered to be useful in teaching and vice-versa.

*Table 4*
BLIX/Esthetic rating.

| | Rating of visuals (in %) | | | | |
|---|---|---|---|---|---|
| BLIX | Very poor | Poor | Neither nor | Good | Very good |
| 4.5–5.0 | 0 | 10 | 10 | 30 | 50 |
| 4.0–4.5 | 2 | 30 | 30 | 27 | 11 |
| 3.5–4.0 | 10 | 26 | 41 | 23 | 0 |
| 3.0–3.5 | 16 | 28 | 36 | 20 | 0 |
| 2.5–3.0 | 60 | 30 | 10 | 0 | 0 |

n = 128 ratings

*Table 5*
BLIX/Usefulness in teaching.

| | Rating of visuals (in %) | | | | |
|---|---|---|---|---|---|
| BLIX | Very poor | Poor | Neither nor | Good | Very good |
| 4.5–5.0 | 0 | 0 | 20 | 30 | 50 |
| 4.0–4.5 | 18 | 29 | 31 | 20 | 2 |
| 3.5–4.0 | 40 | 23 | 32 | 5 | 0 |
| 3.0–3.5 | 56 | 28 | 16 | 0 | 0 |
| 2.5–3.0 | 100 | 0 | 0 | 0 | 0 |

n = 130 ratings

*Table 6*
BLIX/Production time

| | Production time | | | | |
|---|---|---|---|---|---|
| BLIX | -30 min | 30–60 min | 60–90 min | 90–120 min | More than 120 min |
| 4.5–5.0 | – | 1 | – | – | 1 |
| 4.0–4.5 | – | 5 | 2 | – | 2 |
| 3.5–4.0 | 2 | 1 | 3 | – | 2 |
| 3.0–3.5 | – | 1 | 1 | 2 | 1 |
| 2.5–3.0 | 1 | 1 | – | – | – |

n = 26 pictures

## 3. Importance of picture variables

The objective of the work with BLIX was to obtain a tool of practical use in the design and production of visuals for instruction. The following questions can be posed as regards the importance of different variables in visual languages:

1. How are different variables perceived by different people?
2. Which instructions on how to execute the different variables are easy or difficult for the artist to follow?
3. Which variables have the greatest and the least importance to a picture's readability and how are the different variables ranked?
4. How many variables (and which) are required to attain a satisfactory assessment of a picture's readability?

To obtain an answer to the first question, I had a number of subjects rate the same pictures. The ratings of children and adults reveal which variables are easy or difficult to perceive in the manner intended by the artist.

To obtain an answer to the second question, I had several different artists tackle the same assignment. An analysis of their visuals disclosed the variables which are easy or difficult to observe or which are not a natural part of visual creativity.

To obtain an answer to the third question, I had several experienced experts rate the importance of different variables. These ratings provided the basis for a ranking of the variables.

A synthesis of the results of these three analyses provided the basis for a revised BLIX rating which should be useful in practical work situations.

### 3.1 Perception of picture variables

As a phase in a preliminary study of BLIX, 15 adult students attending a course on information dissemination were given the task of rating three different visuals of the same subject. The subject of the visual, a "red vixen with cubs outside a fox-burrow," had been used in a previous study of attitudes to visuals made according to different production techniques (Figure 3). One version was printed in black & white, one was printed in color, and the third was a three-dimensional autostereo print version in color. The test pictures were all made from the same color negative and were thus identical from the point of view of content. According to the BLIX values the color version was easier to read than the black & white version or the autostereo version (Table 7).

Figure 3. Red fox, vixen with cubs outside a fox-burrow. A diorama at the Museum of Natural History, Stockholm.

Variables other than the color factor are apparently affected when a visual is changed from black & white to color. The subjects in this study rated "contrast" as being greater in the color version than in both the other versions. The number of details in the pictures was felt to be greater in both the color versions than in the black & white version. The factor "technical quality" was assessed in the same way as the general ranking, i.e. the color version was ranked as best in this respect and the autostereo version as worst.

Table 7

BLIX ratings by adult subjects of different versions of the same image subject.

| Version | Mean rating | Highest rating | Lowest rating |
|---|---|---|---|
| Color | 3.0 | 3.3 | 2.5 |
| Black & white | 2.6 | 3.0 | 2.0 |
| Autostereo | 2.3 | 3.1 | 1.9 |

n = 15

According to an earlier attitude study, both children and adults liked the color version best and the black & white picture least. However, the technical execution of the autostereo version was such that the children liked it, even though it was felt to be "indistinct" or "blurred."

Most of the variables were rated the same by 90% and even up to 100% of the subjects for each picture version. Opinions were divided about certain variables, i.e. "contrast," the "degree of realism," "technical quality," and the number of "centers of interest."

Children and adults subsequently rated the six different test pictures of the blue titmouse (Figure 1). The BLIX values disclosed that these groups also ranked the pictures in complete accordance with the intended and anticipated ranking (see Table 10, 1 and 2).

There was an expected rating for each individual variable in each test picture. An analysis of the ratings made by subjects can disclose the extent to which different people perceive each individual variable in the same way or differently. There was considerably wider spread in the child subjects than in the adult subjects. The mean deviation from the optimum result was 2.5 in children (51, i.e. 969 ratings) as opposed to 1.0 in adults (95, i.e. 1805 ratings). The same difference was also expressed by the finding that the mean value of ratings of picture variables, according to the expectations arising from the drawing instructions, was 60% in children and 83% in the adult subjects (Table 8).

The adult subjects displayed far greater certainty than children in their rating of the different variables. The child subjects and adult subjects could be subdivided into two groups (Table 8):

a) Close agreement (more than 70% of the ratings were in accordance with expectations) and

b) Poor agreement (less than 70%).

The variables rated in close agreement were color or black & white, external shape, picture legend, picture size and external contour. The remaining variables were rated in poor agreement. All of the adult subjects rated "picture size" quite correctly. All the variables, except "realism and degree of detail" (i.e., the degree of realism) also displayed close agreement by the adult subjects.

Differences in the ratings made by children and by adults disclosed the variables which are particularly difficult to perceive (Table 8). The five "most difficult" variables were:

-- Layout 3, symbols as aids to interpretation (69%)

-- Layout 1, the number of centers of interest (55%)

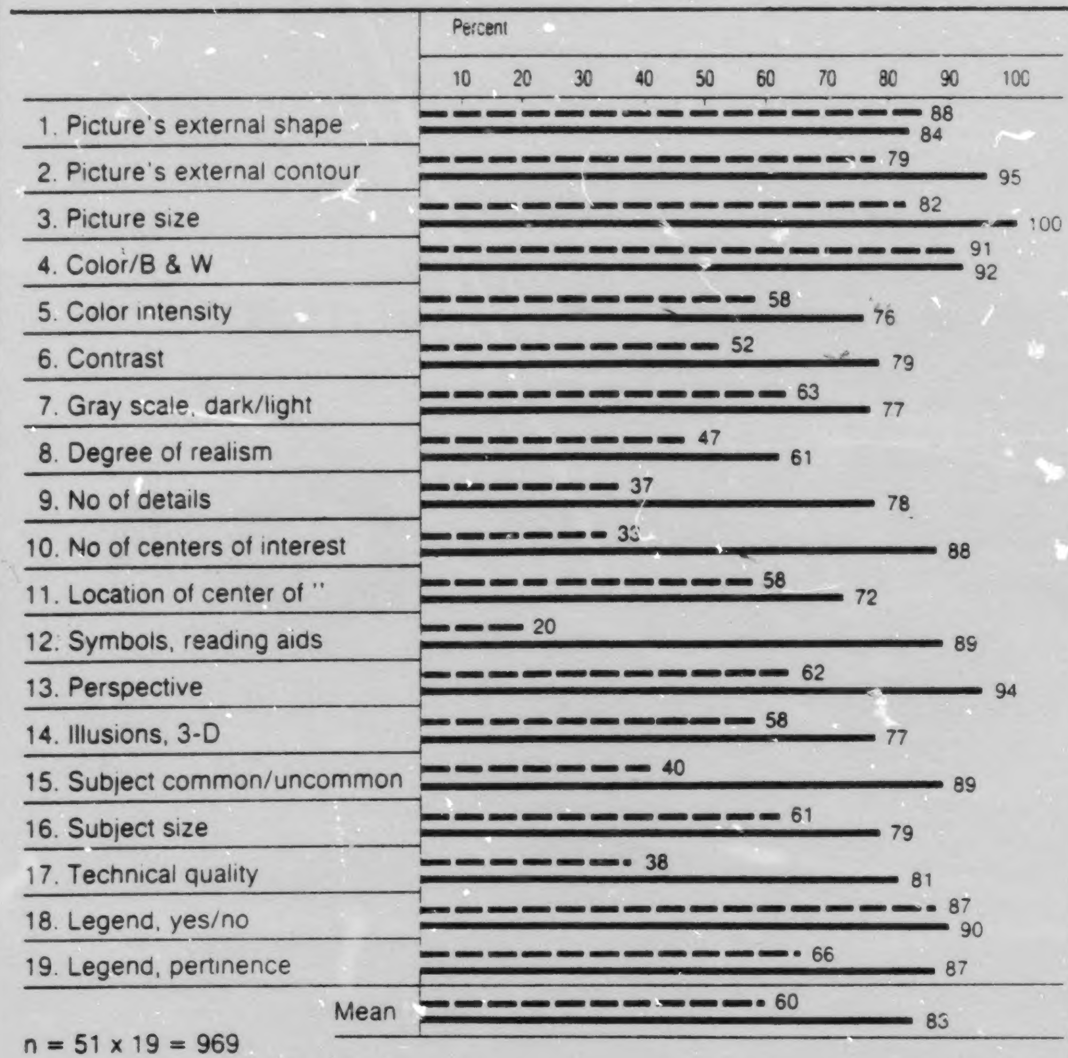
-- Subject 1, common/uncommon (49%)

-- Technical quality (43%)

-- Realism and degree of detail 2, number of details (41%)

Table 8

The rating (as a % of expectations) by children (upper line) and adults (lower line) of picture variables.



n = 51 x 19 = 969
n = 95 x 19 = 1805

## 3.2 The importance of instructions

A ranking of the variables according to the frequency with which the highest BLIX ratings were assigned to pictures produced by the students at the School of Applied Arts who followed the instructions (Table 3, group 1) disclosed that the variables could be divided into three categories:

a) Total observance (100%)
b) Fairly good observance (70-100%)
c) Poor observance (less than 70%)

The variables were distributed as follows:

a) Total observance

-- The pictures should be in color
-- The picture's center of interest should be close to the picture's optical center
-- The picture should only display central perspective
-- The picture should not contain any built-in optical illusions
-- The subject should be easy to recognize
-- The important part of the subject should be large and clear
-- The legend should be brief, easy to understand, and preferably redundant

b) Fairly good observance

-- The picture should be "free form," round or oval (88%)
-- The picture should display a high degree of realism and be "true to life" (88%)
-- The number of details in the picture should be limited (71%)

c) Poor observance

-- The picture's external contours should be diffuse so the picture fades into the background (47%)
-- The picture size should be 50 to 200 cm2 (7.75 to 31 sq. in.) (47%)
-- The picture's contrast should be clear (41%)
-- The picture's technical quality should be "good," i.e. neither matt nor overly glossy (35%)
-- The intensity of the picture's colors should be high (24%)

The corresponding analysis of the BLIX ratings assigned to pictures made by students who reported that they had not followed the instructions (Table 3, Group 2) made it possible to see the extent of any similarities and disparities between Groups 1 and 2. With the exception of the variable "Color" and "Center of interest close to the optical center," most of the variables in Category a) above displayed a frequency of 100%. In Group 2, a number of pictures displayed the following:

-- A limited degree of realism, the picture instead being "artistic" and ambiguous, i.e. 89% in Group 2 vs. 12% in Group 1 (difference = 77%)

- The center of interest was not close to the optical center (difference = 67%)
- No clear contrast (difference = 41%)
- Number of details not small (difference = 41%)
- Other than optimum size (difference = 36%)
- Technical quality unsatisfactory (difference = 35%)

## 3.3 Ranking of picture variables

The way children and adults respond to the different picture variables showed that these variables undoubtedly vary in the importance of their contribution to picture readability. It is as yet impossible to rank or assign "weights" to the different variables. In view of the results reported under the two preceding headings, the following recommendations appear to be justified:

In the production of *materials for teaching* for children, it is important to ensure that the:

- picture should be in color when color is desirable
- contours of the picture should be "free," round or oval
- legend should be brief, easy to understand and be pertinent to the picture
- pictures should not be too small or too large
- picture's external contours should be blurred, diffuse and fade into the background.

Moreover,

- Pictures should not be too "artistic" but be "true-to-life" and possess a high degree of realism
- A picture's center of interest should be located close to its optical center.

In an attempt to obtain more information on the importance of different picture variables, I asked experienced "visual design experts" to rate the importance of each individual visual language factor to the total readability of a picture. They indicated their ratings on a questionnaire with a semantic scale from "very slight importance" to "very great importance." The results suggest that it is very difficult to rank the variables (Table 9). Only a few of the variables were regarded as being of very slight or very great importance. A number of respondents noted that in their view the variables *varied in importance depending on the context*. Thus a variable may be very important in one context but of only slight importance in another.

## 3.4 Revised BLIX rating

The test pictures used when children and adults rated the different variables were ranked in complete accordance with the intended picture readability index. However, the test pictures formed two distinct groups with relatively slight differences between the groups in readability but with major inter-group differences.

Table 9

Ratings by experts of the importance of individual visual language variables for the total readability of a picture according to the scale "very slight" to "very great importance." Ratings in actual numbers.

| Variable | Very slight importance | Slight importance | Neither slight nor great importance | Great importance | Very great importance |
|---|---|---|---|---|---|
| 1. Picture's external shape | 1 | 1 | 3 | 9 | 1 |
| 2. Picture's external contour | 1 | 1 | 4 | 8 | 1 |
| 3. Picture size |  | 1 | 4 | 9 | 1 |
| 4. Color/B & W |  | 1 | 3 | 6 | 3 |
| 5. Color intensity |  | 1 | 4 | 5 | 3 |
| 6. Contrast |  |  | 3 | 6 | 4 |
| 7. Gray scale, dark/light |  |  | 3 | 7 | 3 |
| 8. Degree of realism |  |  | 1 | 3 | 11 |
| 9. Lack of ambiguity | 1 |  | 1 | 3 | 8 |
| 10. No of details |  |  | 2 | 9 | 4 |
| 11. No of centers of interest |  |  | 2 | 11 | 2 |
| 12. Center of interest at optical center |  |  | 2 | 6 | 7 |
| 13. Symbols, etc as reading aids |  |  | 1 | 8 | 4 |
| 14. Perspective | 1 |  | 2 |  | 12 |
| 15. Subject common/uncommon |  |  | 3 | 11 | 1 |
| 16. Subject size | 1 | 1 | 6 | 6 | 1 |
| 17. Technical quality |  |  | 1 | 6 | 6 |
| 18. Legend, yes/no |  |  |  | 3 | 10 |
| 19. Layout, interplay withother pictures & legends |  |  | 1 | 4 | 10 |
| 20. Type of visual |  | 1 | 4 | 6 | 3 |
| 21. Credibility |  |  | 3 | 3 | 7 |

n = 15

A revised calculation of a readability index in which only five variables are rated according to "yes" or "no" alternatives disclosed the corresponding clear subdivision of the pictures into two distinct groups. For adults, the mean values according to the two rating alternatives were 4.2-4.1 and 1.1-0.7 for groups with "easy to read" and "hard to read" pictures respectively (Table 10).

Table 10

Mean BLIX values according to ratings by children and adults for six versions of a picture whose subject was a "blue titmouse perched on a branch."

| Intended BLIX values | Mean BLIX values (19 variables) | | | | Mean BLIX values (5 variables) | |
|---|---|---|---|---|---|---|
| | Children[1] | | Adults[2] | | Adults[3] | |
| 5 | 3.6 | | 4.9 | | 5.0 | |
| 4 | 3.4 | 3.3 | 4.2 | 4.2 | 4.1 | 4.1 |
| 3 | 2.8 | ——— | 3.2 | ——— | 3.1 | ——— |
| 2 | 1.5 | | 2.0 | | 1.0 | |
| 1 | 1.2 | 1.3 | 1.3 | 1.1 | 0.1 | 0.7 |
| 0 | 1.2 | | 0.1 | | 1.0 | |

[1]n = 51 children (9-12 years)
[2]n = 95 adults
[3]n = 42 adults

The variables rated according to the revised picture readability calculation are shown in the list below.

Revised BLIX-ratings

| Questions | Yes/No |
|---|---|
| 1. a) Color picture: Picture executed in a true-to-life color<br>b) Black & white picture: The contrast and gray scale in the picture are clear. | |
| 2. The picture has a shape other than a square or a rectangle or covers an entire page. | |
| 3. The picture has a legend which is brief, easy to understand and deals with the picture. | |
| 4. The picture is unambiguous and not too "artistic," and ambiguous. | |
| 5. The picture has a dominant center of interest at or near its optical center (middle of the picture) and few details which can be regarded as distracting. | |
| Total number of yes answers | |

The total number of "yes" answers provides a direct value for picture readability in which 0 = "a virtually incomprehensible picture," 1 = "very hard to read," 2 = "hard to read," 3 = "neither hard nor easy to read," 4 = "easy to read," and 5 = "very easy to read."

A calculation of the picture readability index for the 26 mushroom pictures according to this revised method produced results in very close agreement with values obtained previously. The mean value changed from 3.8 to 3.3. For the most part, the BLIX ratings shifted to the nearest whole number value. There was a whole number change in the BLIX rating in only two cases (from 3.4 and 3.1 to 2).

During a continuation course for children's librarians at the Library College in Boras, Sweden, in May 1982, the 26 participants rated the three visuals with the subject "Red fox. Vixen with cubs outside the burrow" in accordance with the revised BLIX-rating. As before (Table 7) the color picture was most legible. The black & white one was second and the autostereo version was last. Mean ratings changed from 3.0 to 2.7, from 2.6 to 2.4 and from 2.3 to 1.6 for the respective pictures. However, the spread in the different ratings was rather wide in this case (Table 11).

Table 11

BLIX ratings (%) by adult subjects of various versions of the same image subject, "Red fox. Vixen with cubs outside a fox-burrow."

| | BLIX | | | | | | Mean Value |
|---|---|---|---|---|---|---|---|
| Version | 0 | 1 | 2 | 3 | 4 | 5 | |
| Color | 12 | 8 | 19 | 31 | 27 | 4 | 2.7 |
| Black & white | 8 | 4 | 42 | 31 | 15 | 0 | 2.4 |
| Autostereo | 15 | 31 | 27 | 27 | 0 | 0 | 1.6 |

n = 26

An analysis of the ratings of the five individual variables showed that primarily variables 1 and 5 were rated differently.

Fifty percent of the subjects judged the colors (in this particular picture) to be true to life. They also felt that the visuals had a dominant center of interest in or near the optical center and few details which could be viewed as distracting. On the other hand, 85% and 77% respectively were of the opinion that the versions in black & white and color were unambiguous and not too "artistic." No less than 73% considered the autostereo version to be ambiguous which is in accordance with previous results. The evaluations for variables 2 and 3 agreed very closely with the expectations.

## 4. The use of BLIX

As has been pointed out previously the objective of the work with BLIX was to obtain a practical "tool" for use in the design and production of visuals for teaching purposes. However, BLIX must not be an end in itself. Index values always run the risk of being interpreted as absolute values. On the other hand, some idea of the average difficulty or ease (BLIX) with which a picture can be read is very useful information. Detailed knowledge of the importance of individual picture variables is useful too. The ability of a message-receiver to study the contents of a word-picture-message is likely to increase considerably if the message is designed taking this knowledge into account. Knowledge of picture readablilty, i.e. our total ability to interpret and understand a visual message with regard to our perception, the content, the execution and the context of the visual, enables us to make a visual-description. A visual-description is a description in words and outlines of a visual which does not yet exist. Whether the intentions of the instructor are correctly carried out can subsequently be checked to some degree by a picture analysis, i.e. an evaluative description of a visual, and to some degree by different practical tests. The results of these tests lead to a revised visual description which leads to yet another more effective instruction material, etc.

## 5. Summary

Factors in visual language have both functional and semantic properties and are related to criteria such as the content and execution of a visual, its context and the subsequent perception, learning, and memory.

Experiments with BLIX, a picture readability index, have resulted in knowledge which can be put to practical use in the design and production of visuals for instruction. BLIX is defined as an indication of the average difficulty or ease with which a visual can be read. Experiments with the ranking and rating of test pictures showed that pictures with high BLIX values were ranked and rated higher by children and adults than those with lower values.

Experiments with the actual making of pictures showed that, despite detailed instructions on the execution of the visuals, there was still plenty of scope for individual creativity. It was also shown that informative pictures drawn so that their BLIX ratings were high to a large extent were rated as esthetically pleasing, as "suitable" or "very suitable" for use in teaching and did not take more time (cost more money) than pictures with lower BLIX ratings. Instructions on the execution had to be followed for reliable and satisfactory results.

Analysis of the importance of different variables showed that adults had a better grasp of picture variables than children. Adults are therefore naturally better equipped than children to understand visual language. As a result, these analyses can be used as a practical tool in both instructional message design and in picture analysis.

Theories and experiments presented in this report supply a platform for more complete cross-cultural studies of the importance of the individual variables in visual language. These results will be used to frame recommendations or "guidelines" on the way different variables should be designed and executed in visuals to be used in the design of instructional messages.

## 6. References

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# VISUAL ATTENTION TO PICTURE AND WORD MATERIALS AS INFLUENCED BY THE CHARACTERISTICS OF LEARNERS AND THE DESIGN OF MATERIALS

by

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Purpose. The purpose of this study was to examine the cognitive strategies of students studying materials combining pictures and words. In other words, what happens when visual and verbal literacy interact? The long range goal was to improve the match between the characteristics of students and the design of materials.

Recent research on verbal and imaginal processing suggests that words and pictures are cognitively disparate, requiring different kinds and amounts of processing. This suggests potential cognitive problems where words and pictures are mixed indiscriminately in instructional materials.

What follows was an exploratory study of the cognitive strategies that skilled learners employ in studying word/picture materials, e. g., textbooks.

Procedure. A convenience sample of 24 students was selected from a graduate class in education such that half were males and half females. Half of each sex grouping were randomly assigned to each of two page-layout treatments.

The design variables were complexity at two levels, simple vs. complex, and page layout at two levels, picture first and then words (PV) vs. words first then picture (VP). See Figure 1 for an example of a PV layout. The simple material was from an 8th grade text, while the complex was from a scientific research journal. They contained comparable numbers of words, but sentences in the complex material averaged about twice as long. The personological variables were sex, cognitive style (field dependent/field independent), and prior knowledge.

The dependent variable was visual attention as indicated by eye-movement data, specifically the amount of time spent attending to each area of the materials (duration), the number of shifts between areas (transitions), and the pattern of transitions (sequences).

It was predicted that cognitive strategies for complex materials would include longer study durations and more transitions

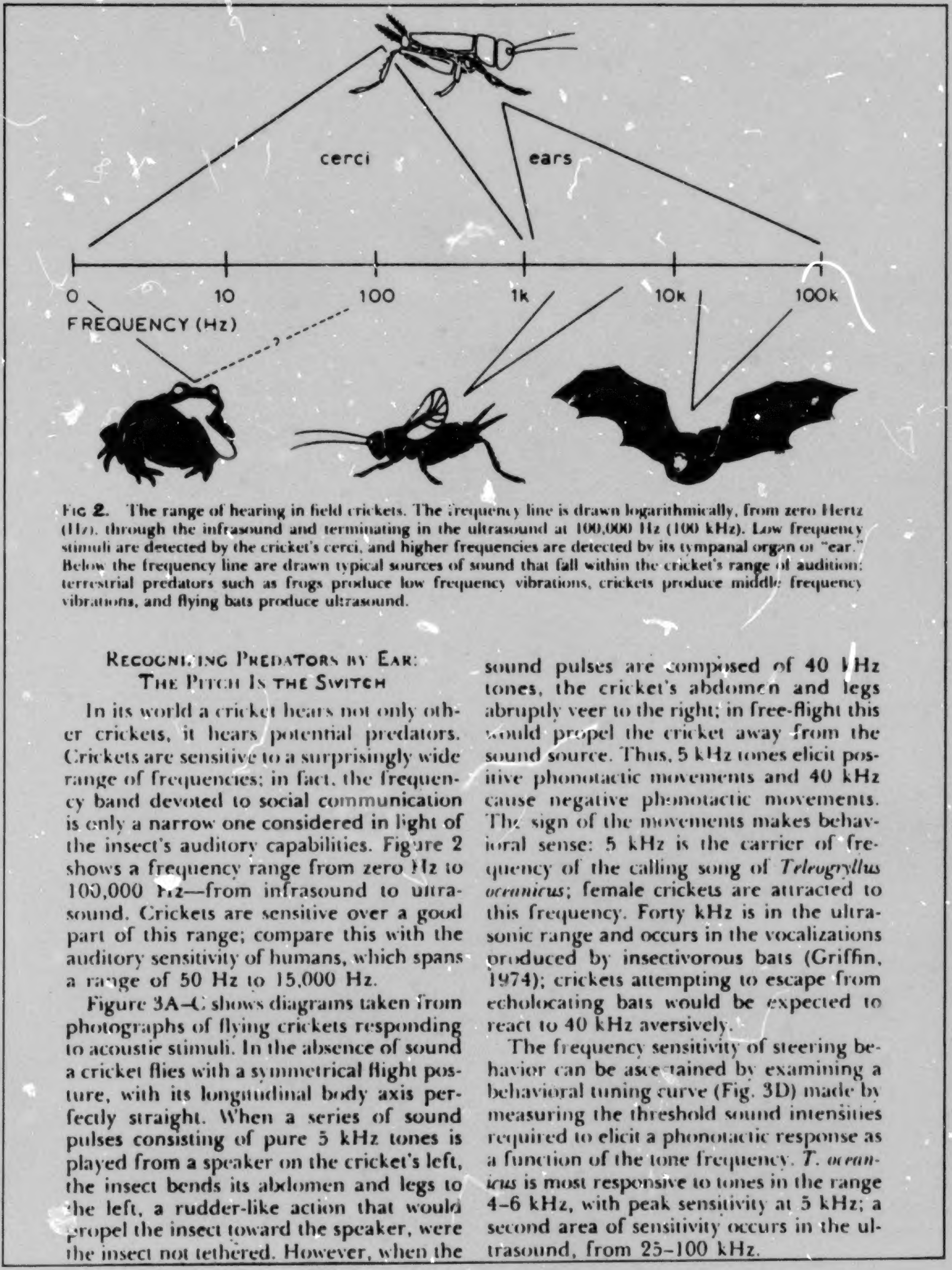
cerci
ears
0
10
100
1k
10k
100k
FREQUENCY (Hz)
?

FIG 2. The range of hearing in field crickets. The frequency line is drawn logarithmically, from zero Hertz (Hz), through the infrasound and terminating in the ultrasound at 100,000 Hz (100 kHz). Low frequency stimuli are detected by the cricket's cerci, and higher frequencies are detected by its tympanal organ or "ear." Below the frequency line are drawn typical sources of sound that fall within the cricket's range of audition: terrestrial predators such as frogs produce low frequency vibrations, crickets produce middle frequency vibrations, and flying bats produce ultrasound.

### Recognizing Predators by Ear: The Pitch Is the Switch

In its world a cricket hears not only other crickets, it hears potential predators. Crickets are sensitive to a surprisingly wide range of frequencies; in fact, the frequency band devoted to social communication is only a narrow one considered in light of the insect's auditory capabilities. Figure 2 shows a frequency range from zero Hz to 100,000 Hz—from infrasound to ultrasound. Crickets are sensitive over a good part of this range; compare this with the auditory sensitivity of humans, which spans a range of 50 Hz to 15,000 Hz.

Figure 3A–C shows diagrams taken from photographs of flying crickets responding to acoustic stimuli. In the absence of sound a cricket flies with a symmetrical flight posture, with its longitudinal body axis perfectly straight. When a series of sound pulses consisting of pure 5 kHz tones is played from a speaker on the cricket's left, the insect bends its abdomen and legs to the left, a rudder-like action that would propel the insect toward the speaker, were the insect not tethered. However, when the sound pulses are composed of 40 kHz tones, the cricket's abdomen and legs abruptly veer to the right; in free-flight this would propel the cricket away from the sound source. Thus, 5 kHz tones elicit positive phonotactic movements and 40 kHz cause negative phonotactic movements. The sign of the movements makes behavioral sense: 5 kHz is the carrier of frequency of the calling song of *Teleogryllus oceanicus*; female crickets are attracted to this frequency. Forty kHz is in the ultrasonic range and occurs in the vocalizations produced by insectivorous bats (Griffin, 1974); crickets attempting to escape from echolocating bats would be expected to react to 40 kHz aversively.

The frequency sensitivity of steering behavior can be ascertained by examining a behavioral tuning curve (Fig. 3D) made by measuring the threshold sound intensities required to elicit a phonotactic response as a function of the tone frequency. *T. oceanicus* is most responsive to tones in the range 4–6 kHz, with peak sensitivity at 5 kHz; a second area of sensitivity occurs in the ultrasound, from 25–100 kHz.

Figure 1. Example of layout treatment at the PV level, i.e., picture first, then words.

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than for simple materials. Different cognitive strategies were expected for the two page-layouts, but the direction of those differences was not predicted. The evidence that women tend to have higher verbal skills (Lips & Colwill, 1978) as well as higher grades in general (Maccoby & Jacklin, 1974) was the basis for predictions of greater attention to words and longer overall study duration for women than men. The evidence that field independents tend to be more analytical and field dependents more global (Witkin, et al., 1974) led to the prediction that field independents would depart from the given sequence of words and pictures while field dependents would tend to follow it.

Subjects were instructed to study the material as though it had been assigned for them to understand and remember. They were then fitted with head-mounted eye-movement-detecting equipment (NAC Eyemark IV). They were allowed as much time as needed to study the materials.

Subjects then completed a brief questionnaire concerning the relative familiarity and difficulty of the materials and the number of related courses (biology) which they had taken. They then took a cognitive style test, the GEFT (Group Embedded Figures Test).

Raw data records consisted of videotape recordings showing the stimulus a subject was studying plus a superimposed marker which indicated just where on the stimulus the subject was looking at any moment. The four pages of stimuli were divided into 30 significant areas, i.e., either figures in the pictures or captions and paragraphs in the text. Read out from the videotape records were the duration of attention to each area and the sequence of transitions between areas. Twenty of the 24 records were usable.

Results: Overall. A three-way ANOVA of the effects of Sex and Layout (independent measures) and Complexity (repeated measure) on total transitions revealed the predicted significant main effect for complexity, $p < .001$, but no effect for sex or layout.

Analysis of the effects on total duration revealed significant differences, as expected, for both sex, $p < .004$, and complexity, $p < .001$. Females atttended longer overall to the study materials than did males. All subjects studied the complex materials more than the simple.

There was no main effect for layout (PV vs. VP) nor for prior knowledge. Analyses of the data relative to familiarity of the content as well as number of biology courses taken revealed no significant relationships to cognitive strategy.

There was a significant positive correlation between cognitive style (GEFT) and number of transitions for complex materials only (Spearman $p < .034$, Kendall $p < .037$). So, a median split was made of the subjects by GEFT score and two groups formed, higher scorers (Field Independents) and lower scorers (Field

Dependents). An ANOVA revealed a significant two-way interaction between cognitive style and complexity, $p < .003$, for transitions. While subjects of both cognitive styles made more transitions on complex materials than on simple, the field independents made a larger adjustment to complexity, i.e., they made relatively fewer transitions for the simple and relatively more transitions for the complex materials than did field dependents. See Figure 2.

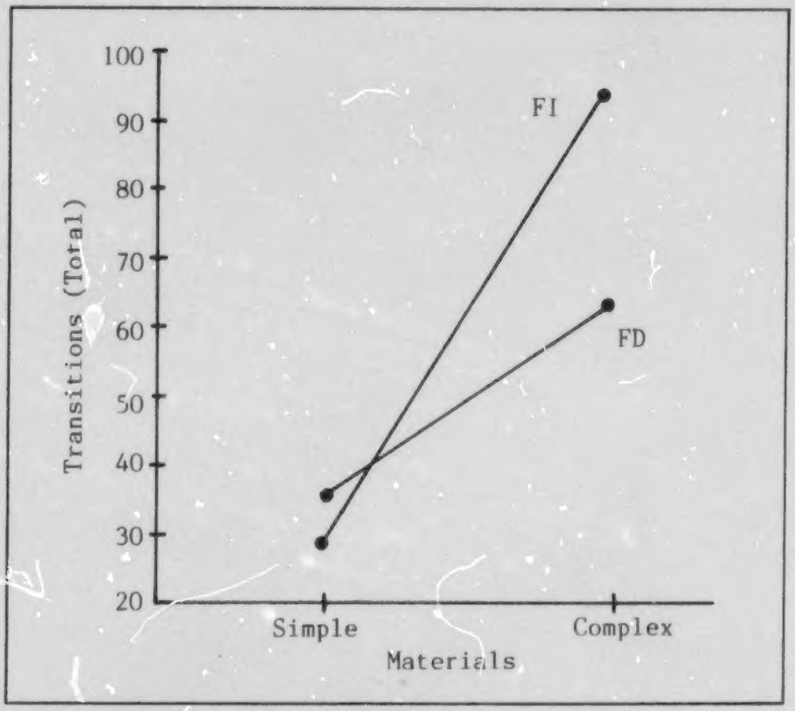

Figure 2. Two-way interaction between cognitive style (Field Dependence/Field Independence) and complexity of study materials on cognitive strategy (number of attention transitions between word/picture areas). Apparently, Field Independents (FI) made a greater strategy adjustment to complexity than did Field Dependents (FD).

Results: Complex Material. Because subjects' strategies seemed most influenced by the complexity factor, it was decided to analyze the most complex page further. A three-way ANOVA, Page Layout by Sex by Sequence, revealed a significant main effect for sequence, $p < .05$. There were, of course, more transitions in the given sequence (top down) than in the reversed. However, there was a significant two-way interaction between sex and sequence, $p < .05$, the females favoring the given order and the males the reversed. This was further modified by a three-way interaction involving page layout, which revealed that the tendency for males to make more reverse order transitions was limited to the VP layout condition (verbal first, then pictorial). See Figure 3.

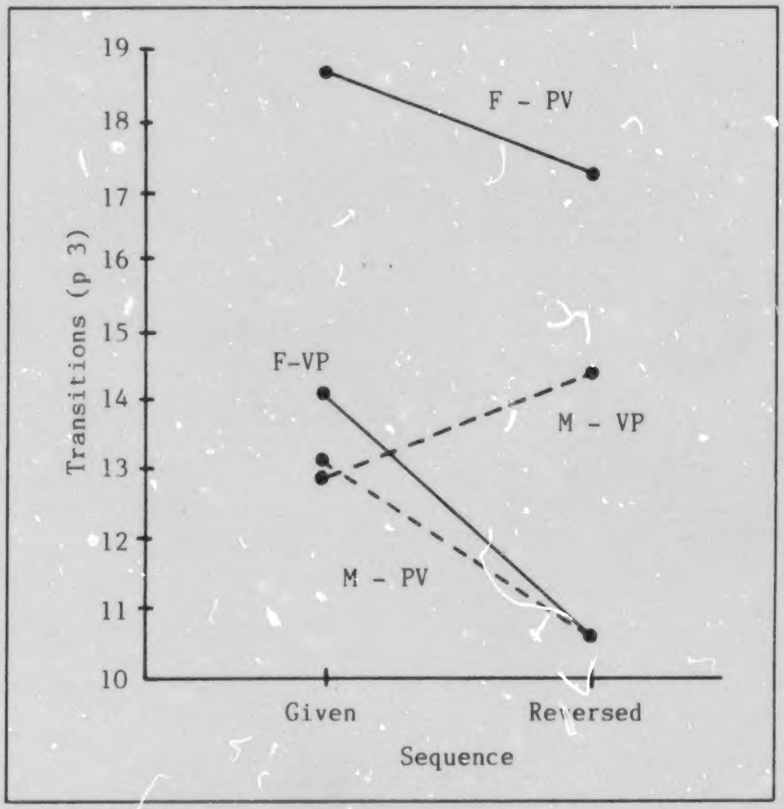

Figure 3. Three-way interaction between sex (M/F), page layout (words first and then pictures, VP, or the opposite, PV), and study sequence (top down as Given, or bottom up as Reversed) for numbers of transitions on the most complex page, p3. Apparently, the most compatible layout for females was VP and for males, PV, for here they made fewer transitions overall and these were mostly in the Given sequence.

The above interactions suggest a very interesting possibility. Assume that a compatible match of cognitive strategy and page layout would show up as a largely straight through (top down) attention sequence, i.e., a minimum number of transitions in the given order and still fewer in the reversed order. It follows, according to this assumption, that the most compatible layout for males was PV and for females VP. See Figure 3 for the curves with a low overall number of transitions and with more in the given than reversed order.

A further analysis was made of attention patterns to the five pictorial areas, two related verbal areas, and one caption area on the complex page. A two-way ANOVA, Sex by Layout, revealed no differences in attention to picture areas but a significant difference in attention to verbal areas, $p < .05$. As predicted, women made more transitions to verbal areas and maintained attention there longer than males. For the caption area there was a significant effect for layout, there being more transitions to the caption, $p < .01$, and longer durations on the caption, $p < .05$, for the PV layout than for the VP layout. This is understandable because the PV layout put the caption in the middle of the page where it was more noticeable, whereas the VP layout put it at the bottom.

Another analysis of the complex page, Cognitive Style by Layout, revealed no differences for the verbal areas but significant differences for pictorial areas, $p < .05$ for durations and $p < .01$ for transitions. Field independents looked longer and more often at picture areas on the complex page than did field dependents. This was not predicted.

Conclusions. Of the design variables, the complexity factor was clearly the most determinative of learner strategy. Of the learner variables, prior knowledge had no effect on strategy. Perhaps the measures of prior knowledge were inadequate. The other learner variables, cognitive style and sex, were reliably associated with learner strategies.

These main effects and interactions with cognitive style and sex were largely as predicted from prior research and theory. However, there were some surprises, e.g., the effect of cognitive style on cognitive strategy adaptation to instructional material complexity and the effect of sex on strategies for sequencing attention to words and pictures.

Clearly, more such studies are needed to confirm or disconfirm these conclusions. However, the results do suggest that the design of science materials for graduate students may need to take account of two learner variables, sex and cognitive style, and two design variables, complexity and picture-word layout.

The results also suggest some of the dimensions of visual literacy, particularly as these interact with those of verbal literacy.

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# VISUAL LITERACY AND COGNITIVE STYLE: ASSESSING FIELD DEPENDENCY WITH THEATRICAL SLIDES

by

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Cognitive styles, those individual difference variables that influence the learning process, have received considerable attention in recent years. Of the more than 15 dimensions that have been identified, Witkin's concepts of field dependence and field independence (FD/FI) have been the most heavily researched (Spotts & Mackler, 1967; Vernon, 1972). To date, however, very little knowledge exists concerning the abilities and relationships among individuals possessing the various traits associated with the FD/FI continuum and the capacity to recognize visual dominance in pictures.

Used frequently in the theatre, visual dominance was viewed in the study as the degree of bodily emphasis attained by one's position and stance within a group. An individual in such dominance becomes the center of attention, the visually most important person, in a given stage composition. A presentation at the 1981 IVLA Conference, "Visual Idioms: A Theatrical Approach to Visual Literacy," (Johnson & Lampe) described many of the compositional techniques used to achieve dominance in a stage play.

The ability to recognize such dominance, as a perceptual task, may be viewed as the capacity to properly interpret a stage composition by identifying the most visually emphatic person within a group. Past research suggests that such identification capacities should be influenced by one's degree of field dependency/field independency.

In the broadest sense, the bipolar dimensions of FD/FI are conceived as those consistent tendencies to rely on, respectively, internal or external points of reference for information processing (Witkin & Goodenough, 1976). "In theory," comments Goodenough (1976, p. 675), "field dependence or independence is considered to be one expression of a more general individual difference dimension, defined at one extreme by a global mode of field approach and at the other extreme by an articulated mode of field approach."

Field independence is typically viewed as an analytical approach to perception (Spotts & Mackler, 1967; Sherrif & Williams, 1980; Witkin & Goodenough, 1976). Generally, field independents are better able to distinguish discrete shapes. They can more easily single out or 'disembed' simple objects from more complex backgrounds (Karp, 1963).

Field dependents, on the other hand, tend to experience difficulty with such tasks. Because FDs have been shown to be less able to keep an item separate from its context, it has been suggested that they apply a perceptual strategy different from those of their FI counterparts (Goodenough, 1976). Witkin and his colleagues use the term global field approach to "designate the style of functioning that involves submission to the dominant organization of the field and an inability to solve problems which require that contexts be overcome" (Spotts & Mackler, 1967, p. 240).

Research has provided evidence that indicates a tendency for FDs to be more responsive to the social aspects of a task situation (Witkin et al., 1977; Goodenough, 1976; Goldberger & Fitzgibbons, 1966). FDs pay more attention to incidental cues and are more influenced by the learning environment (Ruble & Nakamura, 1972; Crutchfield, Woodworth & Albrecht, 1958). Because of their reliance on social cues and an attentiveness to the stimulus field as a whole, field dependents should be better able to identify within a group of people that individual who is dominant relative to others. A review of the literature supported such a contention. The purpose of the study, then, was to investigate the proposition that a relationship existed between field dependent tendencies and the ability to recognize visual dominance. The proposed relationship was explored and operationalized in terms of subjects' performances on the Group Embedded Figures Test (GEFT), a standardized measure of field independence, and the Visual Emphasis Recognition Test (VERT), an experimenter-produced instrument requiring the identification of a dominant person within a theatrically posed group. It was hoped that the results would serve as the basis for additional research on FD/FI processing tendencies and their relationship to perceptual tasks associated with recognizing visual dominance.

The subjects for the study were 105 fifth grade students enrolled in the Iowa City (Iowa) Public Schools. Iowa City is a university community with a population of about 40,000. Four different elementary buildings were represented in the sample. Of the 155 students originally invited to participate, 45 boys and 60 girls volunteered and had received the consent of their parents/guardians. The mean age of subjects was 11.71 years.

## Procedures

After a brief introduction and overview of what would transpire, subjects first were administered the GEFT as the independent measure. There are three parts to the test comprising a total of 25 problems that require subjects to identify within complex shapes simpler figures hidden in them. The first seven items serve as sample problems and are not scored. Participants have 10 minutes to complete Sections II and III, which each contain nine scored problems. Subjects with the greater number of correct identifications (i.e. the higher scores) are considered to be more field independent. Those with lower scores are considered to be more field dependent and are more holistically oriented.

Subjects were next administered the VERT, the dependent measure. To create this assessment 83 production slides from the University of Iowa Department of Theatre were initially obtained. Each slide depicted two or more characters in a play where, in the opinion of the researcher, one person was portrayed as visually more important than the others. A photographic print was made of each slide. On each, vinyl letters were attached to identify up to seven of the characters pictured. The prints were then reconverted to slides. Randomly ordered, these were viewed and rated by 11 University faculty members and students from the Theatre Department. To validate the existence of the stage emphasis techniques used, each rater indicated which character he/she thought was visually dominant. Consistent identification by at least 9 of the 11 raters occurred for 47 of the slides. These, in turn, comprised the visuals used with the VERT.

During the study, subjects were given 10 seconds to view each slide and choose by letter that person they felt to be the most visually important of those pictured. A single Kodak Carousel projector with a variable lens was used to display the slides. In each of the six classroom visitations comprising the experiment, constant image size and seating arrangements were consistent. Slides were advanced automatically with the aid of synchronized pulse signals on an audio tape.

## Results

As mentioned, the study sought to investigate the possible relationship among field dependency and the ability to recognize visual dominance. Since no research existed to directly support such a relationship, the study was considered exploratory in nature; a null hypothesis was established. One-way analysis of variance techniques were applied to the data gathered through the two assessments. An extreme groups design was used. With this technique, only the upper and lower sets of scores on the GEFT were compared to those on the VERT. An extreme groups approach is not without precedence in FD/FI research. Wachtel (1968) used such a design to investigate the effects of FD/FI on analytic functioning tasks. In the present study, scores within the middle 20% range of the GEFT were initially dropped from analysis of variance calculations. Field dependency was represented by the 41 lowest scores attained on the GEFT. Field independency was similarly classified and was determined by the 41 highest scores. In addition to ANOVA procedures, correlational coefficients and other descriptive data were also used to compare group performance. As described below, all results were significant; for this reason additional post hoc analyses were also conducted for all 105 scores.

For both measures, correlation coefficients and analysis of variance techniques were obtained using the Statistical Analysis

System (SAS) computer program. Table 1 reports the correlational data. All coefficients were negative in value; as noted, three are significant at the .05 level. The strongest relationship, $r$, = -0.31, $p$ = .0044 occurred between FDs and FIs when treated as extreme groups and indicated that subjects attaining higher scores on the independent measure (GEFT) tended to perform with less proficiency on the dependent measure (VERT). Conversely, field dependent subjects, as defined by their relatively lower GEFT scores, responded with greater accuracy to the visual emphasis recognition items than did their FI counterparts.

### Table 1

### Correlation Coefficients and Significance Levels For the Dependent (VERT) and Independent (GEFT) Measures

| Independent Variable (GEFT) | Dependent Variable (VERT) |
|---|---|
| All Scores<br>(N = 105) | - 0.30*<br>$p$ = .0013 |
| FD<br>(N = 41) | - 0.16<br>$p$ = .2929 |
| FI<br>(N = 41) | - 0.31*<br>$p$ = .0450 |
| Combined<br>FD/FI<br>(N = 82) | - 0.31*<br>$p$ = .0044 |

Note: FD = GEFT (independent variable) scores between 0 and 4
FI = GEFT (independent variables) scores between 10 and 18

* Significance at $p < .05$

Table 2 presents the summary of the analysis of variance computations. A significant value, $F$ = 5.28, $p$ = .0241, is reported for the extreme groups. Such a value indicated that the ratio of the between-groups variation to the within-groups variation was sufficiently large to reject the null hypothesis at the

.05 level. Interpretations of such findings suggested that fifth grade subjects possessing field dependent traits performed better than their field independent peers when the task required visual dominance recognition.

Table 2

Summary Table for Extreme FD/FI Groups
N = 82

| Source | SS | df | MS | F | PR > F |
|---|---|---|---|---|---|
| Between | 142.24 | 1 | 142.24 | 5.28* | .0241 |
| Within | 2153.85 | 80 | 26.92 | | |
| Total | 2296.09 | 81 | | | |

* Significant at $p < .05$

Because the values for the extreme groups were significant, it was relevant to consider additional analysis involving all subjects who participated in the study (N = 105). Using the practical median value of 7.0, subjects taking the GEFT and scoring between 0 and 6 were classified as field dependent. Those attaining GEFT scores between 7 and 18, conversely, were considered field independent. A split-median t-Test was used to compare the scores on the dependent measure, the VERT. Results of this procedure were significant, $\underline{F}$ (1, 103) = 7.43, $\underline{p}$ = .0076.

Additional post hoc analysis involved those items on the VERT that seemed to discriminate well. Twenty such items were found that tended to cluster around the 50% level of item difficulty and were removed from context to form a subset of scores. These were subsequently identified by the researcher as VERT-2. New dependent measure scores were calculated. As a group, FDs attained both a higher mean (X = 11.07) and a higher median (Mdn = 11.55) than either the whole sample of 105 or the 41 FIs. The analysis of these data, based on the use of 20 items rather than the original 47, further indicated that reliability increased from 0.70 to 0.80.

A second split-median t-Test was used to compare all 105 scores on the GEFT to those on VERT-2. Significant at the .05 level, the value obtained, $\underline{F}$ (1, 103) = 5.49, $\underline{p}$ = .0211, offered additional support for the rejection of the study's null hypothesis.

## Conclusions and Future Research

The study focused on the relationship between field dependency and the ability to recognize visual dominance. One of the most important tasks in such a recognition skill should involve the capacity to holistically scan the entire stimulus field to perceive the relationships that may exist among elements. It was reasoned that persons with a more global approach (field dependents) might find such tasks particularly well suited to their cognitive processing modes. The results of the study confirmed this rationale.

Several conclusions can be drawn from the evidence attained in the study. The most noteworthy outcome was the significant degree to which FDs outperformed FIs on the dependent measure. The results suggested that the outcome measure favored dependent tendencies for success. Within the past few years, there has been a call to investigate those areas at which field dependents might excel (Witkin & Goodenough, 1976). Nebelkopf and Dreyer (1970) have further suggested that the concept of perceptual functioning should be considered a salient feature of cognitive style. In one of the few articles critical of currently used FD/FI assessment techniques, the authors have viewed such measures as the Embedded Figures Test as tasks premised on both predetermined and overly-structured perceptual search criteria. "In a sense," they maintain, "S knows what he is looking for, and the problem becomes one of separating out this critical aspect from the total stimulus display" (p. 636). It would appear that the experimenter- produced VERT assessment overcomes this limitation and could further represent a new framework from which to examine the construct of globality.

To the extent that visual emphasis recognition is a skill calling for inferential ability, results of the study seem to be consistent with the notion that the more continuous, incremental strategies employed by FDs operate advantageously in tasks requiring the location and identification of an emphatic figure within a group. Studies by Bereiter, et al. (1979) and by Nebelkopf and Dreyer (1973) support such a contention.

Although not directly reported in the study, the effects of visual complexity are also of interest. As noted in a number of studies (Bone, 1978; Dickie, 1969; Carrier & Clark, 1978; Canelos, et al., 1980), the difficulty of concept attainment for FDs is significantly related to such visual dimensions as explicitness and ambiguity. Item analyses of the visuals used in the VERT indicated very few error differences among FDs and FIs. To the extent that the visuals used varied in their complexity, the results of the present study may raise doubt concerning field independent superiority in this regard. When adhering to some communicative pattern or convention, it could be that even complex and ambiguous visuals can be properly interpreted by FDs, who are able to apply their more global tendencies in scanning the field as a whole. Additional research is needed that would better delineate the degree of complexity of visuals similar to those of the VERT and the subsequent impact of an explicit-ambiguous continuum on performance.

The original study incorporated seven commonly used theatrical techniques as a means of achieving visual dominance (bodily position, stage area occupied, focus, level, triangle, contrast, and isolation). Additional research is also needed that would help determine which convention(s) more specifically favor FD traits for recognition. During brief interview sessions with several subjects following each visitation, it was noted that while FDs appeared to cue more on the convention of focus, FIs were more prone to correctly identify figures in dominance through the technique of level.

According to the evidence gathered in the study, field dependents were shown to perform better on a visual emphasis recognition measure than were their field independent peers. To the extent that such recognition ability may involve concept attainment, inferential capability, and stimulus complexity, FDs have been shown to possess the capacity to perform admirably. A knowledge of one's level of field dependency/independency could be used as a valuable design tool in the creation and implementation of visually oriented instruction.

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# HELPING CHILDREN TO APPLY A CONCEPTUAL MODEL TO THE MAKING OF PHOTOGRAPHS

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Despite its 14 year history as a more or less formal movement in education, 'visual literacy' has yet to rate more than a passing glance from a majority of educators. As a result, it has remained on the periphery of education gently bobbing up and down in the swells of broader and seemingly more significant educational waves. As a discipline, it suffers from the lack of a commonly accepted definition and mainstream sponsorship. It is beset both from within and without by doubts as to the appropriateness of use of such terms as 'literacy' and 'language'. In fact, the term 'visual literacy' has become a catchall label attached to any project with a visual component however uncertain its methodology or outcomes. At an ever more fundamental level, some critics question whether 'seeing' can be taught while others suggest that, even if it can, there is really little necessity to do so. And yet, despite its rather ambivalent ride, visual literacy, unlike other educational waves, has not yet crashed upon the beach.

This paper will address some of the significant issues confronting visual literacy at this point in time--definition of the term, circumscription of the discipline and, most importantly, the need for an improved conceptual framework from which to assess research and practice in the field. In so doing, a point of departure will be suggested, one free of the eclectic business characterizing many visual literacy projects. Based on the systematic study and making of photographs, it is an approach which is readily adaptable to the classroom almost regardless of grade level.

## Definition

It is difficult to determine precisely when the term "visual literacy" entered the educational consciousness. Many attribute the term to John Debes (1968), who if not the originator, did much to popularize the term and ease its entry into contemporary educational thinking. Fransecky and Debes (1972) were responsible for one of the earliest working definitions of visual literacy, one ultimately adopted by the A.E.C.T. (Association for Educational Communication and Technology), although not widely adopted elsewhere possibly due to its rather too comprehensive and lengthy nature. Since then, several definitions of visual literacy have been proposed. Each has offered a slightly different insight into the concept although, central to each, have been the fundamental communication processes of 'decoding' and 'encoding' visual information. For example, Debes and Williams defined a visually literate person as one who "should be able to 'read' visuals with skill, and to 'write' with visuals, expressing himself effectively or even eloquently and appropriately using visual language" (Debes & Williams, 1978, p. 39). It is significant to note that this attempted paralleling of verbal and visual forms of communication, even to the extent of borrowing such terms as 'reading,' 'writing,' and 'language' has been the source of much debate and controversy.

More recently, Hortin and Braden proposed that visual literacy be defined as:

> the ability to understand and use images, including the ability to think, learn, and express oneself in terms of images. (Hortin & Braden, 1981, p. 11)

This definition avoids the use of much potentially controversial terminology while at the same time introducing the concept of thinking in images as an integral and important component of the definition.

In several important respects, Hortin and Braden approach visual thinking from a perspective similar to that of McKim who suggests that visual thinking is carried on through the employment of three types of visual images--those that we see, those that we imagine, and those that we "draw, doodle or paint" (McKim, 1980, p. 7). While not intended to be a definition of visual literacy, the McKim model offers many insights into how a definition might be phrased. In the meantime, Hortin and Braden (1981) call for open discussions on the issue but state their desire for concurrence on a definition, either their own, or some other equally "simple" definition.

## Coming to Terms With 'Visual Literacy'

At the same time as those within the movement struggle for a commonly accepted definition of visual literacy, others debate the probity of the term as applied to the visual arena at all. Cassidy and Knowlton (1983) in a thought provoking paper, suggest that the use of the phrase is both redundant and inappropriate as the term 'literacy' ordinarily refers to "the knowledge and skills necessary for encoding/decoding of print (writing)" which as they correctly suggest, "is ordinarily perceived 'visually'." They go on to state that "it seems quite evident that what is intended by the founding phrase . . . is not 'visual' literacy but 'visual-iconic' literacy" (Cassidy & Knowlton, 1983, p.68).

The arguments presented by Cassidy and Knowlton are both artfully constructed and persuasive. Indeed, we find ourselves in basic agreement with this aspect of their paper while at the same time, somewHat concerned with the scope of the discussion. In spite of the criticisms of those who would reserve literacy for verbal language alone, we find it difficult to imagine that the use of the term 'literacy' will be so limited in the future. Language evolves over time as a result of common usage--often in spite of the protestations of teachers and academics. Since literacy has recently come to be used in relation to computers and media, it seems plausible that its meaning will continue to expand in the North American vernacular to describe more and more of those fields of human endeavour in which individuals achieve competency. Nevertheless, it is important to remember that the scholarly use of language demands that it reflect the findings of researchers, and the arguments of semanticists who seek economy and precision of meaning.

The more substantive point, however, is the need to critically examine the use of terms such as 'language' and 'literacy', as applied to visual communication. As Cassidy and Knowlton point out, comparisons between visual sign systems (visual languages?) and verbal sign systems (verbal languages) are untenable "on phonological, syntactic, and semantic grounds" (Cassidy & Knowlton, 1983, p. 72). In other words, too few of the basic structures of verbal language can be identified in visual forms. Indeed, the visual literacy movement has, perhaps unwittingly, made itself vulnerable to much unnecessary criticism because of the widespread adoption of terms borrowed from the language tradition. Further, despite the many well intentioned attempts to draw exacting parallels and commonalities between verbal and visual forms of communication, such attempts could ultimately prove to be fruitless. For visual literacy adherents a more productive route might be to acknowledge the metaphorical (as opposed to literal) value of language-related terminology. Secondly, consideration could be given to the adoption of less controversial terms.

Less easily dismissed though, are arguments again posited by Cassidy and Knowlton, that

> . . .there is no support, from a developmental perspective, for the teaching of V. L. Given any of a wide range of reasonably normal environments. . .and given an infant or young child with reasonably normal perceptual apparatus, we know the child's perceptual skills will develop normally and without teaching of any sort (Cassidy & Knowlton, 1983, p. 80).

In support of this statement, the authors cite convincing evidence related to the very rapid visual perceptual development of the newborn, research related to the congenitally blind whose sight is restored, and the universality of certain emotional expressions as observed in many cross cultural studies. All offer compelling evidence as to the visual virtuosity of the normally developing human being exposed to a more or less normal visual environment.

Unfortunately, much of the V. L. literature does little to dispel doubts about the viability of visual literacy as an emerging discipline. Books, articles, and papers, individually and collectively, suggest that film study, video art, visual imagery, mnemonics, Bliss symbols, body language, phototherapy, sungrams, cityscapes and, endlessly on, are equal threads in the fabric of visual literacy. It is difficult to determine from this multiplicity of sources--sources which tend to be at once, both massive and at times, contradictory--whether visual literacy is to be achieved through a process of immersion in a singular area of study such as film making or critical TV viewing, or through an eclectic approach involving exposure, however cursory, to as many media forms as possible. The latter approach seems to be the more common, an approach somewhat analagous to becoming physically fit through a process of jogging one week, playing tennis the next, watching football the next, and so on. Assuredly, such an approach does lead to a degree of fitness but lacks the rigour and intensity of a systematic approach to the achievement and maintenance of ever higher levels of competence.

## Parameters

Figure 1 suggests a means by which we may begin to look at the visual environment and to begin to derive meaningful parameters for both a systematic approach to instruction in visual literacy and to the inclusion or exclusion of various subcategories of V. L. For example, frequently, the study of human expression (i. e., body language, gestures, etc.) has been included in V. L. programs as part of a hierarchy of skills considered necessary in the process of becoming visually literate. And yet, neonatal and cross-cultural studies, among others, suggest that these skills are naturally acquired. Even very young children respond to and communicate with a host of very sophisticated facial and bodily gestures, a repertoire which continues to grow as the child matures. What the child may lack at certain stages of development are appropriate verbal labels for these forms of expression but certainly not the means of expression themselves. It could be argued, then, that the study of human expression is, by and large, redundant unless we desire our children to attach verbal labels accurately to these visual expressions.

In a similar manner, we could proceed around the circle asking whether visual skills in each of the identified areas would be naturally acquired or achieved only through instruction. Those skills that are deemed to be naturally acquired (or of minimal significance) could be eliminated from further consideration. Such an approach would lead to such questions as "Do we need to 'learn' to view television and movies or do we acquire these viewing skills naturally?" Similarly, do we need to 'learn' to 'read' other iconic sign systems such as maps, globes, drawings, and photographs or do we acquire these skills naturally as well? If we do, do we in like manner naturally develop capabilities for communication with these same visual processes? More importantly, if we do accept the possibility that, minimally, certain of these skills can be 'enhanced' through instruction, is there a natural or logical starting point?

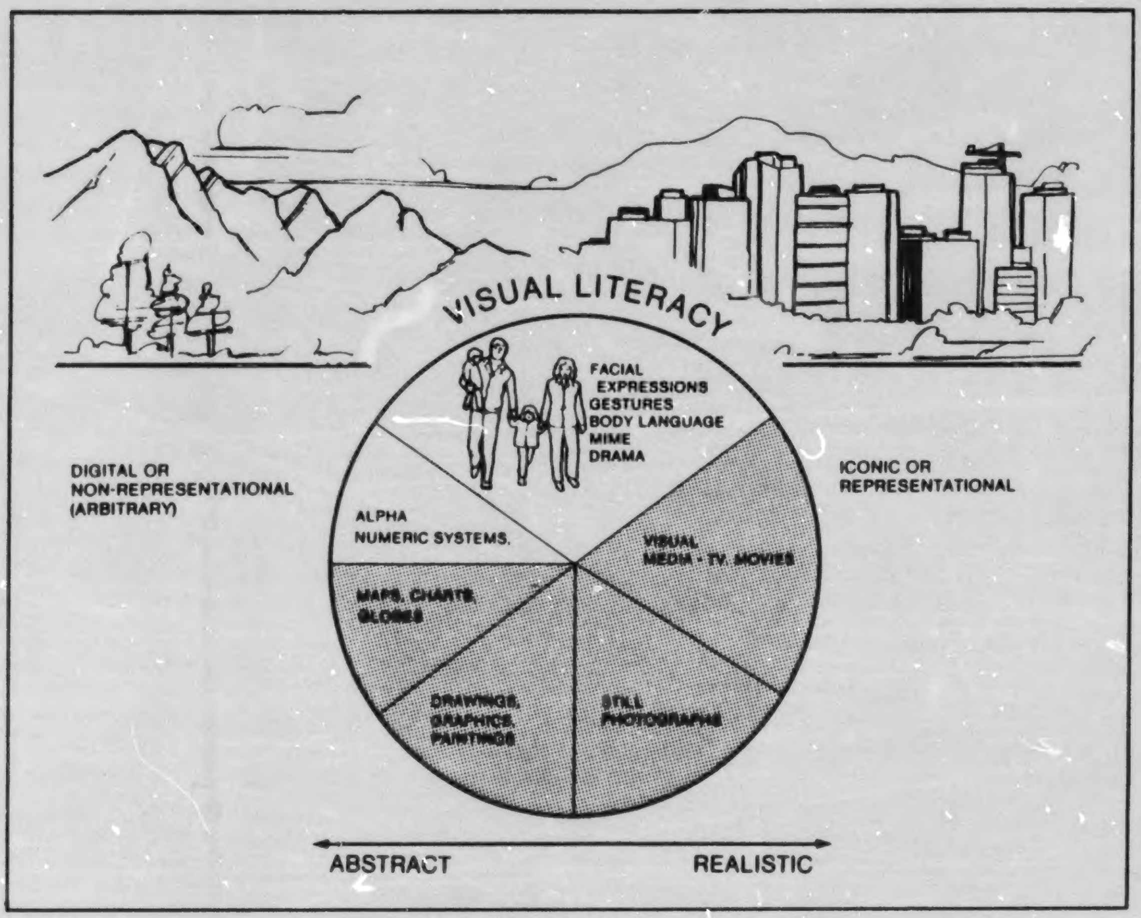
VISUAL LITERACY
FACIAL EXPRESSIONS
GESTURES
BODY LANGUAGE
MIME
DRAMA
DIGITAL OR NON-REPRESENTATIONAL (ARBITRARY)
ICONIC OR REPRESENTATIONAL
ALPHA NUMERIC SYSTEMS.
VISUAL MEDIA - TV. MOVIES
MAPS, CHARTS, GLOBES
DRAWINGS, GRAPHICS, PAINTINGS
STILL PHOTOGRAPHS
ABSTRACT
REALISTIC

Figure 1. Visual literacy as a subset of the visual environment.

The Still Photograph as Starting Point

It is obvious to most practitioners that many of the questions postulated above are rhetorical. There are many real world instances that amply demonstrate individual failure to comprehend visual statements and even greater evidence as to the collective inability of the North American populace to create visual communications. The typical family photo album stands as mute testimony to the visual unawareness that permeates much of our so called "visual society." The laboured and ineffective audiovisual scribblings of the typical elementary school child communicating for the first time with both words and pictures belie our beliefs that media skills are simply acquired. Indeed many adults are capable of little more, even though by adulthood their skills should, if the maturationalists are to be believed, be well developed.

The question confronting us at this juncture is not whether certain visual skills need to be taught but how they can be taught. If, as Knowlton and Cassidy assert, there are fundamental and unbridgeable differences between digital and iconic sign systems, many of the strategies typically applied to the encoding and decoding of digital sign systems would be of questionable value in approaching many forms of visual communication. Additional support of this viewpoint comes from brain researchers and theorists, many of whom speculate that the brain processes verbal and visual information in quite different ways--the former (verbal information), tends to be processed linearly or sequentially while the latter (iconic/visual) information, tends to be processed simultaneously or wholistically. It would seem evident then, that iconic systems, lacking certain of the basic structures found in verbal systems (phonemes, morphemes, syntax, and so on) and processed in markedly different ways, require the application of different strategies if they are to be both readily comprehended and expressed. What is not readily apparent is an obvious or natural starting point, some basic unit of visual communication which would permit insights into many (or even, hopefully all) iconic/visual communication forms.

We believe that one natural starting point may be the study and interpretation of still photographs. Still photographs constitute one of the most common and prevalent forms of visual communication, with one recent estimate suggesting that in excess of ten billion still photographs are taken each year. They appear in books, magazines, advertising brochures, filmstrips, slide sets, and myriad other sources. Still photographs could be considered the basic unit of the motion picture (18 to 24 stills per second) and the television image (30 stills per second). At a strictly conjectural level, still photographs might be a basic unit of an even more fundamental type--tangible reflections of the workings and expression of the metaphoric right brain; different from their imaginal counterparts in that they are detailed and permanent as opposed to less clear and transitory; alike in that they are conceived singularly and perceived wholistically.

Perhaps because they are at once both such fascinating and commonplace subjects, or perhaps strictly because they are stationary targets, still photographs often represent the point of attack for many visual literacy critics. It is a not uncommon argument that photographs require little more than cursory observation to yield up all that they contain. At the conclusion of their paper Cassidy and Knowlton (p. 89) suggest that ". . .one of the great underlying strengths of pictures is their relatively easy readability," (Cassidy & Knowlton, 1983, p. 89). Jonathan Bayer in an essay entitled Concerning Photography writes in a similar vein:

> Most photographs communicate the information they contain almost too immediately. They are universally understood, are high in 'human interest' and require little or no further explication. Many are seen everyday in newspapers and magazines. We glance at them quickly and turn

> the page. We have been told the story (most likely with the help of a caption) but the image itself need never be looked at again.

Bayer goes on to write, however, that:

> the challenge is to venture among photographs that are more difficult to understand. . .These stimulate the mind, assault it, amuse it, set problems for it, and give it the sublime satisfaction of coming up with its own answers. Good photographic images intrigue, present a mystery, or demand to be read. (Bayer, 1977, p. 9)

Such images, Bayer suggests, lead the viewer into the role of 'creator', actively interacting and dialoguing with the photograph.

It would seem then, that photographs naturally align themselves into one of two categories--those that are difficult to understand and those that are not. This observation, while somewhat facetious, underlines the problem faced by media educators and visual literalists. We are still unsure as to whether there is something we need to teach about photographs--and that others _need_ to learn--or whether the majority of pictures that we as educators encounter (outside of those that would be considered artistic) are in the 'easy to understand' category.

## A Conceptual Model Applied to the Classroom

It is our belief that while many visual skills are acquired through a process of maturation, there is a rather significant distinction to be made between a person's ability to identify the visual elements in a photograph and a person's ability to understand or appreciate the photograph as an entity. This difference can be easily demonstrated through an examination of the photograph in Figure 2. Each of the elements is readily identifiable (readable?) even by the young viewer, and yet on another level only the sophisticated viewer may be able to achieve an understanding of it and to come to grips with the secrets it contains.

Some would dismiss this example out of hand because it is clearly an example of an artistic photograph taken by an accomplished photographer. Photographs such as this atuomatically invite our involvement as we struggle to ascertain what the artist intended by it. For most people, this photograph would fall into the 'difficult to understand' category, requiring us, as Bayer would suggest, to interact and dialog with it.

Unlike Bayer, however, we believe that students can and should be taught to dialog with all photographs, not just the 'good' or difficult ones. Snapshots, textbook, and newspaper photos, photographic magazines and books, all provide significant subject matter for interaction and dialog. It is our belief that any individual can be taught to understand and appreciate a much broader range of photographs and through such a process to become much more 'visually literate'.

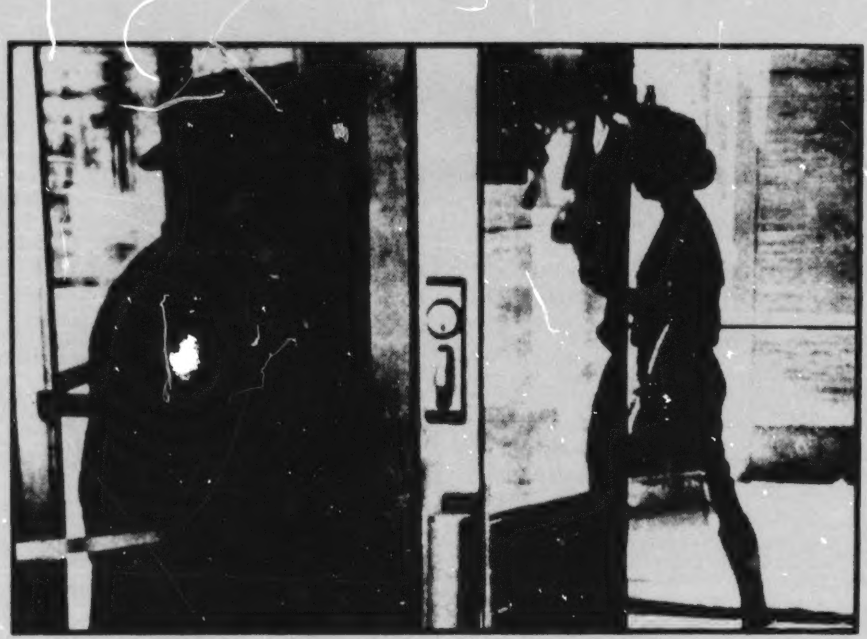

Figure 2. Lee Friedlander: Revolving Doors, 1963. (The identification of the photograph's elements does not necessarily lead to understanding.)

de Leeuw, Eshpeter, and Carswell (1982) proposed that the process of dialoguing or interacting with any image can be greatly facilitated through the use of a relatively simple conceptual model of photography. This model, based on James Britton's (1970) theory of language development, suggests that pictures are taken for one of three readily discernible reasons--to capture a moment in time (the expressive "snap" snot); to convey information to others (the transactional shot); or to explore the visual realms of color, line, texture, mood, and emotion (among others) through poetic photography. Students are taught to dialog or interact with each image through a series of questions. Why did the photographer take the picture? What was the primary intent (expressive, transactional, poetic)? How successful was the photographer? Through a threefold process of studying the photographs of others, using the imagination to both store and generate images, and actual hands-on photographic experiences, students are systematically introduced to the world of photographic expression and understanding.

Twenty-five students from a medium-sized elementary school in Calgary, Alberta, spanning grades three through six, were recently introduced to photography through such a program. Most had had little or no previous photographic experience. The two teachers involved in the project, similarly, had had limited photographic experience and no experience in the teaching of the subject. In the course of a six-week project, meeting once a week for three hours each week, and using individual picture scrapbooks and photo albums as their main vehicles, these students progressed from a state of photographic illiteracy to a point of being thoughtful and insightful commentators and producers of photographic images.

For example, several students randomly selected at the project's conclusion were consistently able to define, in their own terms, the meaning of the concepts transactional, expressive, and poetic. More significantly, these students were able to defend the inclusion of photographs (both of their own making and those chosen from other sources) into categories in ways that demonstrated a significant level of understanding.

The more important question may be whether these students exhibited a degree of 'visual literacy' at the conclusion of the project. As measured by such criteria as their ability to define terms, defend picture selections and, to a more limited extent, communicate visually through expressive, transactional, and poetic means, it was apparent that a significant degree of learning had taken place. Follow-up studies would have to be conducted to determine whether there was any significant longterm gain. We suspect, however, that there was little, if any, lasting effect. The state of being 'visually literate' can no more be acquired in a six-week time span, (even if we agree that visual literacy is what we were about) than can verbal literacy. Any program purporting to deal with literacy must deal with it on an on-going and continuous basis--throughout a school term and then through term after term. The processes of 'seeing', 'imaging', and 'producing', must be repeated again and again. They are processes that can logically begin with the still photograph and then be extended into a variety of other media formats. The ultimate goal is not necessarily to produce better pictures (still or otherwise) but to produce individuals capable of looking at the world both in ways that are different and more complete.

> If you look at a fern and merely say, "Yes, that's a fern", you may not be seeing past the old, familiar label of its name. But if you really 'see' a fern, you will notice triangularity, individual leaf fibres, various shades of green, its sway and dance before the wind. If you put your eyes close to the fern, so close that you cannot focus on the plant at all, but only on objects beyond it, the fern will become a nebulous green haze which drifts across the background scene. You will have found dimensions and hidden beauty not included in the usual definition of a fern, while learning for yourself the difference between looking and seeing. (Patterson, 1979, pp. 10-11)

Perhaps we can ask nothing more of visu[illegible]teracy.

## Summary

While recent criticism of visual literacy has called into question the credibility of the concept, we believe that much of the visual world remains either 'unseen' or unappreciated by significant proportions of the population. As such, we believe that educators can play a vital role in helping individuals develop a more active perception of the world as well as the capability to communicate those perceptions visually to others. It is our belief that the process can be most effectively begun through an examination of the still photograph and that, through a simple conceptual model capable of being understood by children as young as the third grade level. We believe further that 'literacy' is not achieved through a process of eclectic diversity--the shotgun approach: activities must be systematic and repetitive. Furthermore, seeing or viewing alone, is not sufficient. Students must produce, not only at the expressive level but at the transactional and poetic levels as well.

The visual literacy movement has much work to do both definitionally and conceptually. Until resolution of these major issues, however, efforts could be concentrated on learning more about photographs--how they are perceived, understood, and appreciated by children of all age levels--and the degree to which children can learn to communicate with them. At issue is whether photographs of both the easy and difficult variety (and the rest of the visual domain circumscribed by the discipline), can be comprehended and constructed as universally and simply as we now comprehend and construct the verbal domain.

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# ATTENTION: A THEORETICAL PERSPECTIVE

by

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The concept of attention has long been considered central in the field of psychology (Bakan, 1966). E. D. Titchener stated, "Attention is the nerve of the whole psychological system, and that as men judge of it, so shall they be judged before the general tribunal of psychology" (1966, p.24). Titchener further hypothesized that various stimulus properties elicited attention. Among these properties were intensity, form, repetition, suddenness of onset, movement (including tonality), novelty, and associability with extant mental representations (p.28). Titchener's program of research incorporated two goals: to first analyze the structure of perception and, based upon that analysis, to investigate mental operations which included the process of attention. The first stage of his program was never completed and the second never begun (Marx & Hillix, 1973).

William James, on the other hand, was not as concerned with the structure of perception per se. He suggested that the study of mental processes was paramount. He believed attention to be essential to that process. He stated, "My experience is what I agree to attend to" (1981, p. 402). His interest in attention included such issues as number of stimuli to which one could attend at once, stimulus class (i.e., real or represented) and a categorization of type (i.e., derived, immediate, passive, and active) (p. 416). However, like Titchener, James did not produce research which might have given us an empirical definition for attention and a theoretical basis on which such a definition would be based (Marx & Hillix, 1973).

Although, as James put it, "Everyone knows what attention is" (p.403), it remains to be a concept without a rigorous, empirical identity. Indeed, rational definitions are diffuse (Moray, 1969). Berlyne (1970), for example, suggests two aspects of behavior associated with attention: intensive and selective. Kinchla (1980) states that "the only consistent feature of attentional research is an interest in the selective aspects of information processing" (p. 214). I will address myself here to selective attention which is, in Berlyne's words, "a matter of how attention is distributed among elements of a stimulus field" (p.29). The specification of and agreement on a dependent measure is elusive (Mostofsky, 1970). Fleming (1981) proposed eye-movement as such a measure, but he readily admits a lack of a theoretical orientation for explaining his observations using this technique. Fleming and Levie (1979) describe stimulus properties which elicit selective attention in the context of instructional design. These generalizations are reminiscent of

Titchener's hypotheses, but are generated from a careful analysis of various perception research. No doubt such observations and generalizations are of immediate, practical value to the message designer; however, they do not provide a theoretical framework from which researchers might better understand the modus operandi of attention and thereby propose meaningful questions. An understanding of such processes in paradigms other than perception theory might be useful in providing such frameworks. It is in this interest that I present paradigms of attention taken from learning theory.

## Respondent Conditioning

Respondents are behaviors elicited by stimuli. The typical illustration is that of Pavlov's work with dogs (Hulse, Deese, & Egeth, 1975). In this procedure, the dog is presented the stimulus, meat powder. The stimulus elicits a salivating response. The meat powder, in terms of respondent conditioning, is called an unconditioned stimulus (UCS) and the salivation is termed the unconditioned response (UCR). The term "unconditioned" refers to the unlearned, reflex association between the stimulus and the response. This association is believed to be inborn. Pavlov found that after repeatedly presenting the UCS paired with a bell tone, the tone acquired control over the salivating response. The dog would continue to salivate--though in less quantity--with the introduction of the bell tone, alone. The tone is referred to as the conditioned stimulus (CS) and the resulting salivation the conditioned response (CR). This process is schematized in Figure 1.

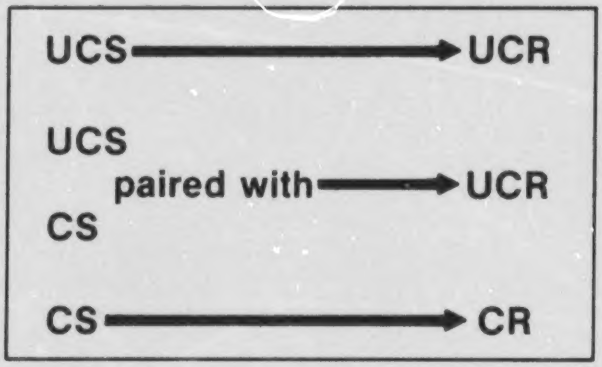

Figure 1. Conditioning process.

The respondent paradigm provides a dependent measure for attention. This is the orienting reflex. Maltzman and Raskin (1966) define the orienting reflex as

> a defined concept. Its antecedent condition is change in stimulation, while its objective measures include depression of the cortical alpha rhythm, the galvanic skin response, pupillary dilation, and a complex

> vasomotor response consisting of cephalic vasodilation and peripheral vasoconstriction (p. 97).

The functions of the reflex are the improvement of stimulus reception and the facilitation of conditioning. The orienting reflex also has its conditioned reciprocal, the conditioned reflex.

This explanation of behavior is limited to reflex responses which provide "automatic, behavioral protection and sustenance" (Reynolds, 1975, p.7). For instance, respondent conditioning is frequently used to explain such human behaviors as escape and avoidance responses elicited by both unconditioned and conditioned stimuli. An example is the child who, having once been bitten by a dog, exhibits a generalized, conditioned fright response in the presence of other dogs. Respondent conditioning does not explain the full range of behavior. It explains new stimulus control but not new responses (Skinner, 1953). However, it is of use to those designing stimulus materials to be used for the purpose of eliciting affective responses. Skinner states,

> Reflexes which are concerned with the internal economy of the organism are seldom of practical importance to other people, but on occasion may arise when we are interested in making someone blush or laugh or cry . . . . More subtle effects are similar: it is important in understanding the effect of a poem to note that conditioned responses may be elicited by such verbal stimuli as "death," or "love," "sorrow," and so on . . . . As advertisers well know, the responses and attitudes evoked by pretty girls, babies, and pleasant scenes may be transferred to trade names, products, pictures of products, and so on. (pp. 56-57).

In summary, the respondent paradigm does have some--though limited--applications for the message designer. However, an explanation of attentional behaviors not tied to unconditioned responses is needed. Principles of operant conditioning provide that explanation.

## Operant Conditioning

The hallmark of operant conditioning is the concept of emitted response and its contiguous reinforcement. A reinforcer is an object or event following an emitted response which increases the probability of that response occurring in the future. It is Skinner's position (1953) that all responses in a learner's repertory (excepting reflex behaviors described above) were shaped by the contingencies of reinforcement which occurred during that person's learning history. This paradigm is represented in Figure 2.

Another principle in this system is that of stimulus control; all behavior is in the control of the environment (stimuli). In the parlance of the Skinnerian psychologist, the antecedent stimulus "*sets the occasion* on which the operant has previously been reinforced" (Reynolds, 1975, p.39). In other words, the learner is more likely to make a particular response in the presence of stimulus conditions like those of past responding. When the learner responds in the presence of certain stimuli and not others, a discrimination has been formed and that particular stimulus is termed the discriminative stimulus (SD).

$$\boxed{S^D \longrightarrow R \longrightarrow S}$$

Figure 2. Contingency reinforcement paradigm.

Except in the case of respondent behavior, the stimulus does not *elicit* a response. Obviously the system must provide an explanation of attention--and it does, in terms of observing behavior. Observing behavior has been described by Dinsmoor (in press). The idea here is that the organism "looks at" or attends to the SD prior to making a response. How then is this attending explained if it is not elicited? The observing response is a function of the discriminative stimulus becoming a conditioned reinforcer. The learner's history of being reinforced following a behavior made in the presence of the SD eventuates in the SD acquiring reinforcing properties. Therefore the observing response is shaped and maintained by the SD.

This theory has provided an explanation of attention in a rather concise manner. However, very little applied research is reported. Ksobiech(1976) used the observing response as a dependent measure in his study of learner reactions to instructional television. Mulvaney, Hughes, Jwaideh, and Dinsmoor (1981) have reported a study where the observing responses of normal and retarded children were compared. L. H. Hughes (personal communication, October, 1982) is presently planning a study of compressed speech and picture redundancy. He plans to investigate the observing behavior of children as they watch a filmstrip presentation accompanied by a time-compressed narrative.

In summary, it appears that operant conditioning may provide an operational definition of attention relative to a broad range of responses, but applications relative to the field of instructional design are needed. Finally, conditioning explanations of behavior are criticized for portraying the learner as passive. The cognitive approach to learning theory suggests an alternative where the learner is in active, willful interaction with his/her environment.

## Cognitive Theory

Cognitive theory presents a dramatic shift in the conceptualization of attention. Perhaps the fulcrum of the theory is its underlying assumption of freewill. Bandura (1977) states, "Theorists who exclude the capacity for self-direction from their view of human potentialities restrict their research" (p. vi). He suggests that attention is of major consideration in understanding the learning process: "Virtually all learning phenomena resulting from direct experience occur on a vicarious basis by observing other people's behavior and its consequences for them" (p.12). Bandura bases his theory of learning on the work of Ulric Neisser, which is generally representative of cognitive learning theory.

Neisser (1976) presented a model of attention which is embedded in his concept of schema (an internal representation of the world). The learner acquires schemata through perceptual experience. Extant schemata direct the learner's attentional processes. Neisser states, "Perceivers pick up only what they have schemata for, and willy-nilly ignore the rest" (p.80). He refers to this process as the perceptual cycle and schematizes it as shown in Figure 3.

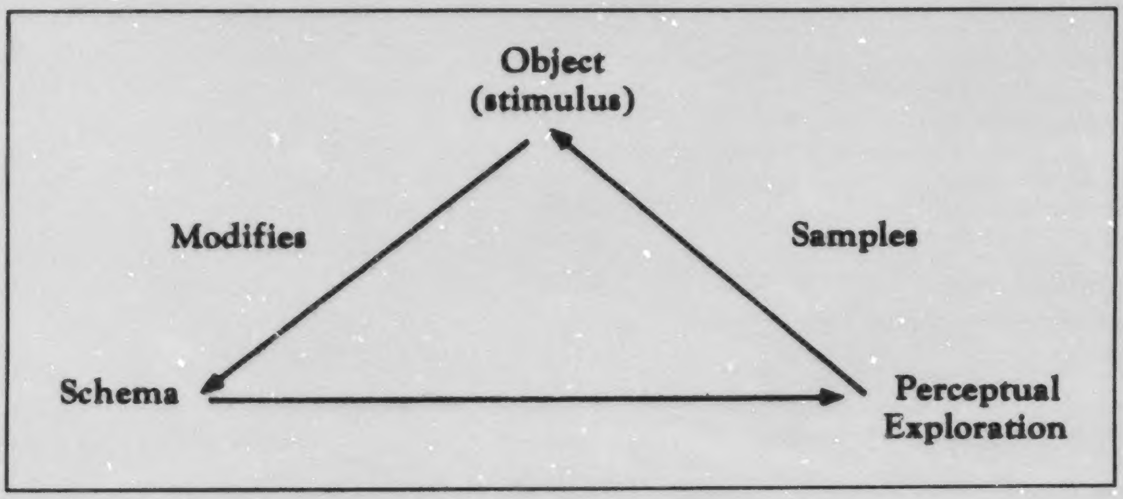

Figure 3. Schematization of Neisser's perceptual cycle.

Here the learner observes the stimulus which is related to and modifies his/her schemata, which, in turn, direct further attending.

Bandura represents Neisser's interactive system in an S-O-R paradigm (see Figure 4). Bandura suggests that the learner's original behaviors are not shaped by the reinforcement of randomly emitted responses, but are acquired through his/her observation and modeling of another's responding. In this theory, the anticipated stimulus reinforcer ($_as^r$) is not important as a consequence of a learner response, but instead, is important in that the observer directs his/her attention to the modeled behavior ( $s_m$ ) only if the anticipated reinforcement for the modeled behavior is one of positive value to him/her. Therefore, the $_as^r$ serves informational and motivational functions.

$$_{a}S^{r} \rightarrow \text{Attention} \rightarrow S_{m} \rightarrow \text{Cognitive Organization} \rightarrow R$$

Figure 4. Bandura's S-O-R paradigm.

This paradigm serves, at least, in giving the message designer some insight into the importance of stimulus properties in observational learning. Bandura hypothesizes that attention is a function of the learner's extant schemata and implies that gaining the learner's attention is a matter of producing materials relevant and suggestive of some future reinforcing consequences. That Bandura does not suggest an operational definition of attention is a problem.

## Summary

I have selected three learning theories which potentially provide theoretical frameworks from which research questions of an applied, as well as a basic, perspective might be better asked. These were respondent conditioning, operant conditioning, and cognitive learning theory. From a practical point of view, all three models provide some insights into why the learner attends. The respondent model suggests the learner associates certain stimuli with particular responses. But this explanation appears to be restricted to automatic, reflex responses seated in the learner's biological defense mechanisms. However, the message designer may well use these principles if the intent of the message is to elicit attention in association with certain types of emotional responses. Secondly, I discussed observing behavior as posited by the Skinnerians. This model presents a concise, operational definition of attention with less clear practical applications. It does hold some promise as a means of evaluating the reinforcing properties of certain stimuli as suggested by the work of Ksobiech, Mulvaney et al., and Hughes (personal communication, October, 1982). Finally, I discussed a cognitive explanation of attention as it was presented by Bandura. He suggests that what is attended by the learner is contingent upon that learner's perception of the stimulus as having a probability of being associated with reinforcing consequences following some future responding. It is implied that the stimulus should be designed in context of the learner's extant schemata.

As theoretical models, the three paradigms exhibit both strengths and weaknesses. The respondent explanation is certainly parsimonious but clearly limited in its ability to explain all stimulus control. The operant explanation is also parsimonious and better able to explain a wider variety of attentional behavior. But, it is problematic in that learning histories are rarely available for analysis and such analysis could be essential to experimental control. Bandura's theory of observational learning is intuitively appealing and does suggest important learner variables. However, it is not parsimonious. It includes no operational definitions and is vulnerable to the inherent difficulties of indirect measures.

For the time being, the nature of the attentional process is relatively diffuse. Research grounded in theory may elucidate the process and finally produce data useful in making better design decisions concerning not only the gaining of attention, but also in shaping and directing it. It is hoped that James was incorrect when he wrote, "Attention may have to go, like many a faculty once deemed essential, like many a verbal phantom, like many an idiot of the tribe" (1970, pp. 14-15).

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# LEARNING FROM TELEVISION

by

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Much of the research on children's learning from television is based in the tradition of media effects. Central to that tradition is the assumption of a causal relationship between perception of stimuli and comprehension. Such studies have dealt primarily with the manipulation of content presentation. Within this conceptual framework, the child's attention is something to be "captured" and held by employing a variety of embellishments, most of which are peripheral to the message content (Lesser, 1974).

More recently, this area of research has taken a more developmental perspective, including an assumption of cognitive evolution and adaptation. As the link which joins the two areas of inquiry, Salomon (1983) says, research on children and television begins with the assumption that "external forces exert their influences through the mediation of already existing cognitive structures" (p. 182).

Yet a third area of influence has been theories of information processing. These have prompted concern with strategies associated with television viewing which facilitate comprehension and retention.

Thus, studies of children and television generally recognize three overarching variables: What the viewer brings (i.e., existing schemata, expectations, social cognition); what the medium brings (i.e., formal features, explicit and implicit content); and what viewing brings to the viewer (i.e., information acquisition, attitudes, behaviors). The third variable is seen as the result of the actions and interactions of the first two. A fourth variable, which is given more weight by some researchers than others, is what the viewing environment contributes (i.e., alternative activities, interactions with other viewers).

## The Child's Understanding of Content

An important aspect of the child's development of attentional strategies is the ability to focus selectively on one or more components of the stimulus presented. A child's capacity to learn central content (i.e., essential to understanding a narrative) has been found to increase linearly with age, while learning of peripheral (i.e., nonessential) content increases until early adolescence and then decreases (Collins, 1970). With age, a child develops not only the ability to attend to a variety of stimulus components but the ability to focus on relevant information and ignore what is irrelevant (Gibson & Rader, 1979).

Gibson and Rader (1979) argue that attentional capacity does not increase with cognitive development; rather increasing knowledge improves the efficiency of stimulus intake, allowing the observer greater time to process new information. As the child becomes more accustomed to standard styles of audiovisual representation (i.e., becomes media literate), attention can be distributed among a greater variety of stimuli. Thus, learning the content of the presentation becomes more efficient.

## The Visual Nature of Attention

Pribam and McGuinness (1975) have delineated three components of attention, based on their review of psychophysiological research:

Arousal -- physiological response to stimulus input;

Activation -- an intention to act;

Effort -- needed to coordinate the other two components.

In an instructional setting, therefore, attention may be described as manifest effort to ensure correspondence between stimuli presented (the source of arousal) and the perceived learning task (the source of activation). Because physiological measures of arousal have no tradition in educational research (Zillmann, 1982), the most common measure of attention is behavioral--the frequency and duration of on-screen glancing.

## Metacognition and Attention

As a construct, attention has been defined as perceptual, task-oriented behavior which may be either internally or externally motivated (Gibson & Rader, 1979). Yet internally motivated attention to task-relevant information varies as the child matures. Children have been shown to possess only limited metacognitive knowledge (i.e., of the factors which affect cognitive processes and outcomes). As described by Flavell (1979), metacognitive knowledge may be divided into three categories:

person -- that people are cognitive processors

strategy -- what methods should be used to achieve a cognitive goal

task -- cognitive demands or goals and the information available to meet them. "The child will come to know that some cognitive enterprises are more demanding and difficult than others, even given the same information" (p. 907).

One or more of these categories may be activated either through conscious effort (e.g., a learning strategy chosen to accomplish a task) or automatically by environmental cues (e.g., production features used to identify a type of learning task on "Sesame Street"). These categories may function without entering the learner's consciousness or, alternatively, may give rise to what Flavell has called metacognitive experience (e.g., as when the learner realizes he or she is puzzled).

## Children and Visual Attention

The visual attraction of television for children has been well documented. While evaluating early episodes of "Sesame Street," the Children's Television Workshop research staff adopted the term "zombie viewer" to describe the child who sat transfixed before the TV set, rarely glancing away from the screen (Reeves, 1970).

Data reported by Anderson and his associates have done much to counter the charge that youngsters are passive captives of visual stimuli. They have amassed considerable evidence suggesting the development in children of increasingly sophisticated viewing strategies, based on "expectations about the temporal and conceptual flow of normal television programs." (Anderson & Lorch, 1983, p. 6)

Anderson and Levin (1976) used both interviews with parents and observation of 1 to 4-year-olds to determine the age at which purposive monitoring of television begins. They charted a dramatic, age-related rise, with 1-year-olds attending to 12 percent of a "Sesame Street" program; 4-year-olds, 55 percent. Although the difference was partially due to longer maintenance of looks by older children, the principal source of the increase was a jump in frequency of looking which occurred at approximately age 2 years, 6 months (from 90 times an hour to 150 times an hour). Similarly, Carew (1980) reported a threefold increase in visual attention to television between the ages of 24 and 30 months. Visual attention appears to increase throughout the preschool years (Alwitt, Anderson, Lorch & Levin, 1980; Anderson & Levin, 1976) and to level off during elementary school years (Calver, Huston, Watkins & Wright, 1982).

A child's pattern of visual attention at any given time is highly correlated with the length of time he or she has been looking at the screen (Anderson, Alwitt, Lorch & Levin, 1979). Attention to the screen by young subjects usually lasts less than three seconds, with a positive correlation between age and probability of initiating and maintaining a look. However, if a look lasted more than 10 seconds, the child's body often relaxed and visual attention could extend to several minutes.

Similarly, the probability that a youngster would initiate a look was negatively correlated with the time the child had been distracted from the screen. The longer a child looked away, the less likely a return to television viewing became. Anderson and his colleagues have called this phenomenon "attentional inertia" and have documented its presence in subjects ranging from 1 to 23 years old. Anderson and Lorch (1983) suggest that attentional inertia is the conceptual complement of habituation, allowing the viewer to maintain attention when content cannot be assigned to available schema.

## The Role of Production Variables

To take greatest advantage of attentional inertia, the media designer should arrange production variables in such a way that they will work for, rather than against, optimal learning. Studies of children's visual attention, although by no means exhaustive, provide general guidelines for the design process.

The effect of a production attribute on visual attention is in part determined by the status of the child's attention at the time the attribute occurs. If the child is already watching, the look may be maintained or terminated; if not, the look may be inhibited or elicited.

Transitions. Visual changes (e.g., a cut from one scene to another) maintain attention, while auditory changes (e.g., a new character's voice, sound effects) elicited looks from those who had been distracted. (Anderson et al., 1979).

Transitions between segments of programming (or from a program to a commercial) are somewhat more complex, however. Termination of an old segment and onset of a new one elicited attention from the distracted but caused those already viewing to look elsewhere. Because children have difficulty relating content across sequences (Collins, 1982; Collins, Sobol & Westby, 1981) the end of a program unit may serve as a cue to terminate attention at the same time that auditory changes associated with the new segment are eliciting looks from non-attenders.

Characters. Children's voices elicit and maintain attention, but their visual presence produces no clear effect (Anderson et al., 1979; Rust, 1971). The presence of women, both visually and auditorially, draws and maintains attention. The sound of a man's voice inhibits and terminates attention.

The onset of puppets, animation, and visual presentation of numbers and letters elicits looks, but has no effect on children who are already watching (Anderson et al., 1979; Rust, 1971). However, these visual effects are confounded by auditory change (e.g., peculiar voices, sound effects) and may have little or no effect of their own. Despite their real-life attraction for many young children, animals in programs decrease attention.

Action. Motion retrieves looks, possibly through the operation of peripheral vision. (Calvert, Huston, Watkins & Wright, 1982; Welch & Watt, 1982). Vigorous stationary activity maintains viewers' looks, if it enhances the meaning of the program segment (Rust, 1971).

Camera movements, such as lengthy zooms and pans, terminate looks without eliciting non-viewers' attention. However, looks also end if the camera remains static for an extended period. Similarly, the presentation of still photos or artwork for longer than 3 seconds reliably depresses attention (Anderson et al., 1979).

*Sound and Music*. Dialogue which refers to an object which can be seen and/or heard produces greater levels of attention than dialogue in which the referent is not present (Anderson et al., 1981). Although Lesser (1974) recommends the use of rhyming, word repetition, and alliteration, findings on their effects are inconsistent. The onset of such techniques sparked visual interest, but attention dropped with their continuation (Anderson & Levin, 1976; Anderson et al., 1979; Rust, 1971). This may be due to confounding in some cases with lack of motion and use of the techniques in a voice-over for still pictures.

The onset of lively music attracts looks, but its continued use is related to lowered attention. (Anderson et al., 1979; Wakshlag, Reitz & Zillmann, 1982). The effect of slow music is not as clear, however, and has been associated with both maintained and reduced attention (Anderson et al., 1979; Wakshlag et al., 1982).

Moreover, Wakshlag and his associates (1982) found that lively music interfered with learning, while slow music did not. A possible explanation is that the up-tempo music was so engaging that young viewers concentrated on it rather than the message content. The authors suggest that music with a rapid tempo, distinct rhythms, and repetitive melodies may best be used early in the program, and then repeated at appropriate intervals to maximize attention and learning.

*Pacing*. Closely related to the use of lively music is the pacing of the production elements. Rapidly paced humorous inserts have been related to higher levels of visual attention and comprehension of message content (Wakshlag, Day & Zillmann, 1981; Zillmann, Williams, Bryant, Boynton & Wolf, 1980).

Consistent use of a rapid tempo may be detrimental to learning, however. In some studies, children had difficulty learning from fast-moving segments but were better able to comprehend information from slower-paced programs (Friedlander, Whetstone & Scott, 1974; Tower, Singer, Singer & Biggs, 1979). Apparently, the use of fast-paced materials improves attention to subsequent content (Zillmann, 1982) and could be employed just prior to presentation of important information. However, a slower pace seems more appropriate for the instructional content itself.

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# DEVELOPMENT AND TESTING OF A VISUAL CONCEPT GENERALIZATION TEST BASED UPON VISUALLY COMPLEX ART REPRODUCTIONS

by

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Many writers in the field of art education have recommended that art curricula should include greater attention to historical, critical, and aesthetic concepts relative to learning about the visual arts (Goodlad, 1968; Rosenberg, 1968; Smith, 1968; Eisner, 1972; Chapman, 1978; Clark and Zimmerman, 1978). These recommendations, made in part to broaden the base of production-centered art curricula, call for greater use of visual displays as learning aids. Once developed, such visual displays would include visually complex art reproductions as major learning resources. Whether prints, or slides, or book illustrations, young learners would be expected to study the images, learn visual concepts, and generalize such concepts in future study of other visual displays.

## Visual Concept Learning

In this research, subjects were asked to observe sets of grouped art reproductions, discriminate likenesses and differences, classify by their discriminations, and generalize concepts by selecting additional exemplars. According to Hull (1920), Harris (1968), and others, these abilities are necessary to the intellectual process of concept formation. That observed visual attributes can be formed into concepts was reported by Hull as early as 1920. Smoke (1932), Heidbreder (1963), Carpenter (1954) and Bruner, Goodnow, and Austin (1956) have all confirmed and used Hull's findings though many questions remain about visual and verbal aspects of concept formation.

Gibson (1950, 1954), for instance, has speculated that just as children are said to think when their sounds become symbols, a person can learn to think in terms of visual symbols; Gibson said that such thinking might be performed more easily than verbal thinking. Gropper (1966) has shown that visual presentations do teach concepts and that visual materials lead to superior test performance on visual test items. McFee (1961) describes *visual concepts*, derived from directly observed form and surface elements of objects as seen in space and light, and *cognitive concepts*, derived from mediated abstraction of verbal review of past learnings. Arnheim (1962, 1969) discusses visual experience as triggering concept learning and postulates that visual observation is a mode of generalization. Many definitions of "concept" require verbal labeling as an aspect of concept formation, but Carrol (1968) sees concepts as essentially nonlinguistic or alinguistic. He claims that concept recognition occurs without the guidance or prompting of language. In seeking some resolution of these claims, the following research has been conducted to develop an instrument to test children's abilities to form and generalize visual concepts from visually complex art reproductions without necessarily having the appropriate vocabulary. In 1969, 1970, and 1971, I developed and used two tests to measure visual concept formation and visual concept generalization by students in kindergarten, and the third, sixth, ninth, and twelfth grades. The visual concept formation test consisted of displays of nine art reproductions. Subjects were asked to study each display, identify seven pictures that looked alike in some way, and to cover with blank cards, two pictures that did not belong with the set. Results of this test yielded much important information, including successful student performance, but the test required time-consuming individual administration. The visual concept generalization test consisted of paired displays. On the first, subjects examined six art reproductions and were asked how they all looked alike. Then, they were shown a second display of three art reproductions and were asked which one looked most like the group just examined. Again, results of this test revealed much information about how children respond to visual displays of art reproductions and demonstrated that they can learn and generalize visual concepts. This research was described fully in a report to the Office of Education (Clark, 1972) and in Studies in Art Education (Clark, 1973).

A major difficulty arose during this early research. Though both tests yielded important group data, reliability of the visual generalization test was insufficient to be used as a diagnostic or achievement measure for individual subjects. The obtained Cronbach Alphas, at each grade, were at or below .30. This difficulty was analyzed and attributed to lack of sufficient item intercorrelation, lack of sufficient test length, and lack of uniform student background in the abilities tested as well as the possibility that each test item called for varying specific abilities. It is probable that each of these causes contributed some error and random noise such that the obtained reliability was insufficient.

## Development of a New Test

During the last four years (1979-1983), the visual concept generalization test results were analyzed, based upon item analysis, and redesign of the items and test was conducted. Many items were eliminated; all retained items were redesigned to create four parallel test forms of 25 items each. Each item was looked at critically and all sources of possible error or interference were eliminated, as much as possible. It was decided to use four reproductions in each generalization display in order to more tightly control salient similarities that would be used to guide formation of appropriate visual concepts. The use of three art reproductions on answer displays was retained. Scoring would be based upon selection of a fully correct reproduction, 2 points; a partially correct reproduction, 1 point; and an incorrect reproduction, 0 points.

The new test forms had item-to-item correspondence of the visual concept to be generalized, the number of critical attributes required to correctly form and generalize each visual concept, and equal numbers of items that displayed subject matter, color, line, shape or form, composition, style, and expressive qualities as predominant features. This control of items was intended to facilitate test-retest reliability measures comparing administrations of matched forms of the new instrument. It was assumed that this procedure would yield higher reliabilities than the split-half test analysis used in the original research.

Another important factor unrelated to redesign of the test was availability of subjects with some training in aesthetic education and the use of art reproductions as learning aids. Psychometric statisticians agree that some degree of common experience among test subjects contributes significantly to the reliability of ability measures taken in schools (Magnusson, 1967; Stanley, 1971). As test redesign and redevelopment was taking place, local school populations were available that had received instruction in skills of visual attending and analysis and discussion of art reproductions. It was assumed that use of such groups in testing of the newly designed tests would correct one of the deficiencies of the original study, lack of uniform student background in the abilities tested.

## Experiment One

In a counterbalanced, quasi-experimental design (Campbell and Stanley, 1963), four forms of the new visual concept generalization test were administered to students in an urban parochial school in Indiana, at the first, second, third, fourth, and fifth grades. Each test administration was scheduled at two week intervals in variously ordered sequences of test forms. The school's art teacher served as test administrator for all of the in-school testing at all grades. Ninety-nine students were tested and each test form was administered to all students at each grade. In the counterbalanced research design, the test forms were administered in various orders at each grade (see Table 1) in order to control the effects of test-retest history and experience.

Table 1

Rotation of text administrations in the counter balanced research design used in Experiment 1.

|  | Occasion |  |  |  |
|---|---|---|---|---|
| Grade | 1 | 2 | 3 | 4 |
| 1 | Form 1 | Form 2 | Form 3 | Form 4 |
| 2 | Form 2 | Form 3 | Form 4 | Form 1 |
| 3 | Form 3 | Form 4 | Form 1 | Form 2 |
| 4 | Form 4 | Form 1 | Form 2 | Form 3 |
| 5 | Form 1 | Form 2 | Form 3 | Form 4 |

The results indicated greatly improved reliabilities (see Table 2) though the small numbers of subjects at each grade kept the grade-form alphas relatively low. Because every subject in every grade took every form of the test, it is possible to report form alphas across all subjects in each grade. These were: Form 1, .7232; Form 2, .4989; Form 3, .7123; Form 4, .7349.

Table 2

Obtained Cronback Alphas for test forms and grades in Experiment 1.

|  |  | Occasion |  |  |  |
|---|---|---|---|---|---|
| Grade |  | Form 1 | Form 2 | Form 3 | Form 4 |
| 1 | N=32 | .5259 | -.0366 | -.1319 | .3481 |
| 2 | N=30 | .3547 | -.1980 | .3900 | .8213 |
| 3 | N=29 | .4279 | -.3983 | .4530 | .3482 |
| 4 | N=22 | .4529 | .7054 | .4632 | .1438 |
| 5 | N=18 | .8171 | -.4920 | .2056 | .1456 |

Collapsing grade/form alphas: M = .2671

N = 131

These grade form alphas and the all-grade form alphas indicated that items on Form 2 were poorly designed and functioning poorly. Nevertheless, a reliability of the total test (based upon all subjects having taken all forms of the test) was calculated using the obtained mean of the form alphas. According to Cronbach (1960), reliability of a total instrument can be calculated from the obtained reliability of each subject or form by the following formula:

$$r_n = \frac{n_r}{1 + (n-1)\ r} .$$

Using the mean form reliability (.6650) and n = 3 (each form had 25 items; the total instrument had 100 items), the calculated reliability of the total instrument is:

$$r_n = \frac{3(.6650)}{1 + (3-1 \times .6650)} = \frac{1.995}{2.333} = .8551.$$

This calculation of total-instrument reliability is consistent with recommendations made by Stanley (1971) for instrument development research. Obviously, the .8551 reliability could be further improved through elimination of poorly functioning items in Form 2 and others (items with irregular or inconsistent response patterns) and elimination of items, in each form, with poor item reliabilities.

In an effort to achieve test efficiency, by reducing the amount of time required, it was decided to eliminate all poorly functioning items and to reduce the number of test forms from four to two. Reliability is positively affected by increased test length (Cronbach, 1960; Stanley, 1971), so the attempt to reduce test length by 50 percent and to maintain the obtained reliabilities from Experiment 1 was problematic. Each set of items from all forms of the test with similarities of subject matter, color, line, shape or form, composition, style, and expressive qualities was critically examined. Item reliabilities at each grade and item response patterns across grades were used to select the most highly reliable and well-performing items as contents for two new test forms with 25 items each, while maintaining the categories of similarities used previously. Items from Forms 1 and 2 of Experiment 1 were used to create a new Form 1. Items from Forms 3 and 4 were used to create a new Form 2.

## Experiment Two

Two forms of a now abbreviated visual concept generalization test were administered to students at the first, second, fourth and fifth grades of a rural public school in Indiana. Each test administration was scheduled at two-week intervals; Form 1 was used as a pre-test and Form 2 was used as a post-test. The local art teacher administered all of the in-school testing to 234 pupils in grades 1 through 5. The reliability (Cronbach Alpha) results of this phase of the testing were encouraging (see Table 3).

Table 3

Obtained Cronbach Alphas for test forms and grades in Experiment 2.

| | Pre-test, Form 1 | Post-test, Form 2 |
|---|---|---|
| Fifth grade<br>n=20 | .2719 | .6450 |
| Fourth grade<br>n=64 | .6481 | .8793 |
| Second grade<br>N=78 | .8954 | .9191 |
| First grade<br>N=36 | .6236 | .9367 |

Differences between reliabilities of the pre- and post-test forms are, apparently, a function of test familiarity. The first test administration was of a relatively unfamiliar set of tasks. Administration of Form 2, as a post-test, yielded improved reliabilities due to a practice effect or greater familiarity with the required tasks. Applying the same Cronbach (1960) formula, used earlier in Experiment 1, to consider the 50 items of the pre- and post-test as one instrument shows a very substantial retention of the previously attained reliability:

$$r_n = \frac{nr}{1 + (n-1)\,r} = \frac{2\,(.7296)}{1 + (2-1)\,.7296} = \frac{1.4592}{1.7296} = .8436.$$

Thus, the Experiment 2 research, in which an instrument was used with 50 percent less items, yielded a very similar result. The test, as it now exists, is substantively reliable with young people in grades one through five.

On the basis of this finding, it is possible to claim that young people do see, and can generalize, visual concepts among visually complex art reproductions that display subject matter, color, line, shape or form, composition, style, and expressive quality similarities. Further testing of the skills of visual concept generalization is planned, with other school populations, in this country and abroad in which the now reliable Clark's Visual Concept Generalization Test will be used in conjunction with other tests of art abilities.

Visually complex phenomena, as art works or art reproductions, are the fundamental content of art curricula, whether production, criticism, history, or aesthetic aspects of art are being studied. As in other school subjects, such phenomena are critical instructional devices. In practice, however, the study of complex visual phenomena is often subordinated to verbal phenomena or simplified into noncomplex graphics that do not represent observed realities. In this research, it was assumed that such practices are detrimental to major educational goals that involve study of visually complex phenomena. The art reproductions used in this research were not simplified or altered in any way. All test administrations were conducted in silence after oral administration and discussion of two training items to prove that visual concepts are the basis for this research. It is claimed, therefore, that young children can learn to form visual concepts based upon discrimination of shared similarities among visually complex images and that visual concepts are learned sufficiently to be generalized to new exemplars that are also visually complex. Thus, a model has been created that can be adapted to any subject matter that would be enriched by directed study of unaltered, visually complex images and that focuses upon observable characteristics of such images.

## Footnote

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# UTILIZING EDUCATIONAL MATERIALS APPROPRIATELY WHEN VILLAGERS ARE VISUALLY ILLITERATE

by

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This paper will present the findings from a descriptive survey of non-literate Haitian women who were shown a series of nine health education pictures and will discuss appropriate uses of educational print media for this population.

## Introduction

In many Third World or developing countries there is a great need to improve both the educational level and the health status of a sizable proportion of the population. Those in greatest need are rural villagers. Non-formal education has been concerned with teaching adults, especially the women. The relationship between the women's needs for education as it relates to improving their families' health has led to increased emphasis on a systematic approach to health education. The rationale for the concern for village women is their key responsibility for the health of their families and their having had little education, either of the formal or informal type.

With literacy rates very low and health education needs high, a dramatic challenge confronts those professionals in the field of international development to achieve successful instruction of non-literate women with non-formal education methods. Often the health professionals attempting to make inroads into this matter come from Western health care systems where illiteracy is not a serious barrier in health education. The adapting or borrowing of teaching methods and materials from the developed world to the developing world may take place without awareness of, or concern for, the vast differences that literacy/illiteracy makes in education.

A specific aspect of literacy that has been receiving increasingly more attention is visual literacy, or the ability to understand pictures. The ability to recognize and interpret pictures is especially difficult for villagers who have not been exposed to visual symbols of the kind used in educational materials.

The visual picture recognition abilities of Haitian village women were of importance to the researcher because of the many factors (socio-economic, education, health care system) which

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place this nation in a high priority need for health education. Although the health status of Haiti is difficult to document, Haiti is listed as a Fourth World country. A Third World nation, territory, or colony is one with either a per capita national output of less than $2,000 or a relatively low "physical quality of life" rating by the Overseas Development Council. Recently, a special category has been added. The Fourth World has less than $300 annual output per person.

High rates of infant and maternal mortality, a short life expectancy, and diseases (malaria, tuberculosis, parasites, diarrheas, infant diseases) indicate the need for preventive public health. Much of the preventive health effort is based on education. There have been few studies of non-literate villagers' abilities in the area of pictorial literacy.

## Location

The study was done in the Republic of Haiti, which has a population of about six million, 90 percent of whom are illiterate. Three rural villages and one urban setting were used. All the villages are examples of a media scarce environment with no billboards and few, if any, signs. The urban dwellers lived in a poor section of a city. In the city there were billboards, some street signs, and some products which have pictures on them. The "buses" go to and from the city and the villages and are brightly painted with designs and words.

## Purpose and Intent

The purpose of the study was to provide contemporary baseline information about the visual literacy of Haitian village women as this was basic to health education. The intent was to explore what non-literate Haitian village women recognized in selected health education pictures.

The broad purpose was operationalized into the following questions: Are there differences in picture recognition traceable to: 1) the categories of content of the pictures (nutrition, cleanliness, and health/disease); 2) the complexity of the picture (low, moderate and high); 3) where the women reside (a mountain, plains, or seacoast village or urban area); and 4) associated with demographic/life history factors (age, schooling, work experience, etc.)

## Literature Review

The central focus of the study was on visual literacy of pictures. Thus, the literature reviewed was primarily in the three main areas of the status of health and health education in Haiti, cross-cultural studies, and the use of visual methods in health teaching. The quality of research in these three areas is variable. There was a theme among earlier studies that revealed the disagreement among anthropologists (e.g., Hudson, 1967; Herskovits, 1952) and psychologists Huggins & Entwisle, 1974) as to who was qualified to study this area, what type of research should be done, and which art style was the most understood. More recently, consensus has appeared among international educators and health educators that while there may be disagreement as to the best picture art style, there is a crucial need to study non-literate learners and the use of visual materials that clearly communicate to visually illiterate people. This is demonstrated in the number of experiments, community development projects, and field studies being reported. Studies which addressed similar concerns about non-literates' abilities to understand pictures were reported from New Guinea (Cook, 1981) and Nepal (Fusell & Haaland, 1975; and Walker, 1979). Those studies which have been done are unanimous in speaking to a concern for Western educated teachers to consider visual literature in Third World settings, in a practical as well as theoretical sense. The literature surveyed indicated a need for more systematic research in the area of pictorial illiteracy and specifically for studies from Haiti.

## Methodology

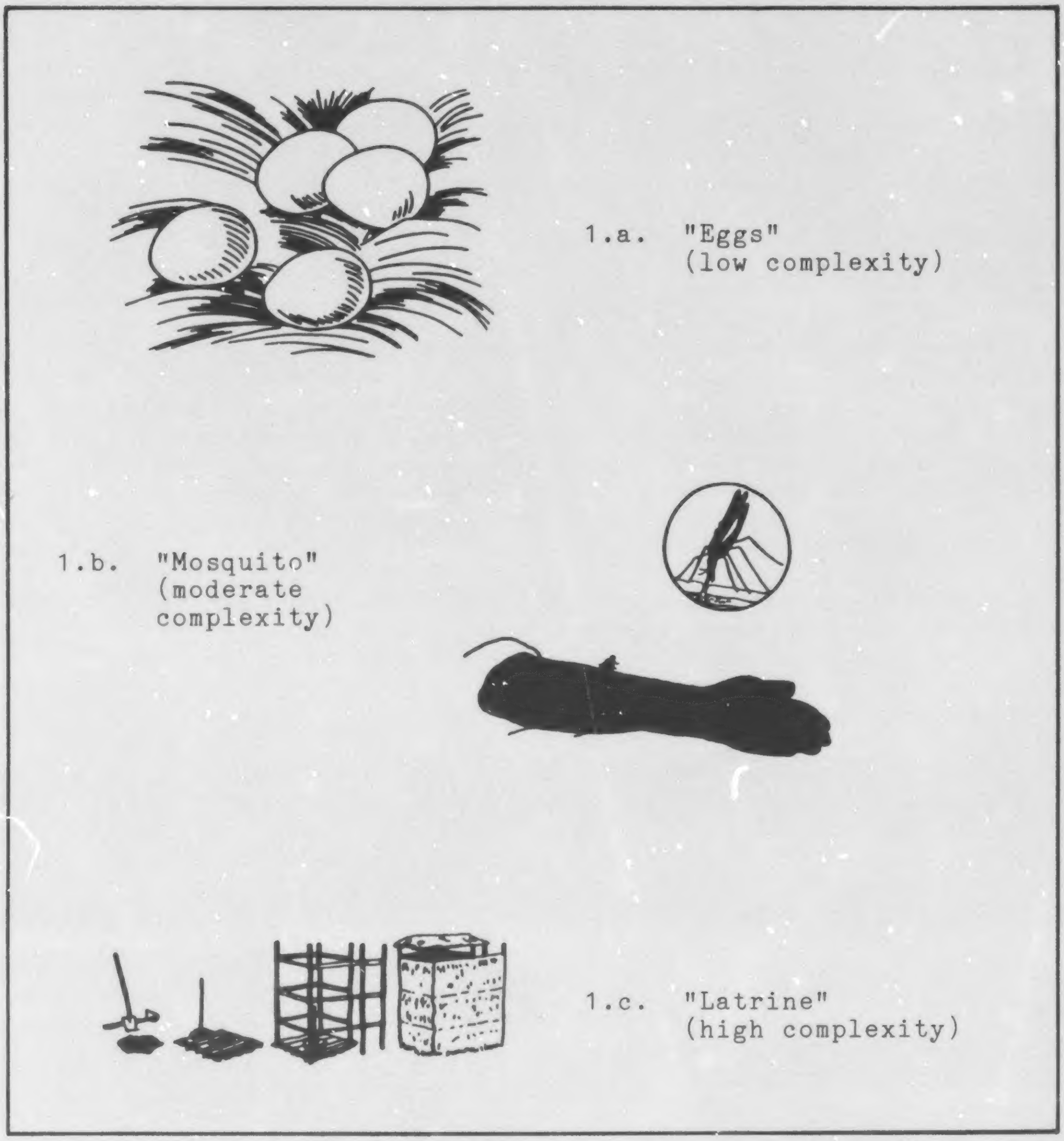
The descriptive survey method used a structured interview to gather responses to the question (What do you see?) in nine selected pictures from a stylized health education measure and demographic/life history data. The women were asked their age, amount of schooling, and whether they had worked as a maid. Further they were asked about their mode of transportation when they went to town and from what substance their house floor was made (wood, cement, mud).

Village men were used as interviewers to obtain the subjects and the information. Twenty-five women from each of three different village types and 35 urban dwellers were selected from a non-random sample. No attempt was made to study causal relationships.

The selection process for the pictorial stimuli was made by the researcher using characteristics considered important by experts in the field of international health education (Holmes, 1961; Kwansa, 1972). Specific pictures were selected from stylized material (material prepared for use in various cultural settings). These were obtained from World Neighbors (Oklahoma City, Oklahoma).

The level of complexity of the individual pictures was determined by having health educators in one university in the United States rank the pictures. These rankings from one to nine were later grouped in low, moderate, and high complexity. To assist in understanding the various complexity levels, the following pictures are selected as representing each of the three levels. (Figure 1) "Eggs" was classified as low complexity, "mosquito" as moderate, and "latrine" as high.

The 990 verbatim responses to the pictorial stimuli (9 pictures x 110 subjects) were rated by the investigator. The ratings were accurate, underinclusive, overinclusive, and inaccurate. Underinclusive and overinclusive were rated as accurate if they did not contain inaccurate statements. Another rating category was "do not know."



1.a. "Eggs"
(low complexity)

1.b. "Mosquito"
(moderate complexity)

1.c. "Latrine"
(high complexity)

Figure 1. Pictures representing three levels of complexity.

## Findings

The findings did provide baseline information about the visual literacy of selected Haitian village women. The factors of picture category of content (health/disease, etc.) and picture complexity (low, moderate, or high level) of health education pictures, residence by site (each of the three villages and urban site), and between the rural and urban subjects were shown to be significant at the $p < .001$ level. The factor of schooling showed less difference, employment as a maid even less than schooling, and age made no difference. In answer to the question of whether pictorial messages were accurately recognized and self explanatory to non-literate Haitian village women, the raw data suggested that the responses of villagers as a whole were less accurate than urban dwellers. The chi square results were significant in establishing that rural villagers did indeed have greater difficulties than their urban counterparts. A comparison of their accuracy follows. (Figure 2)

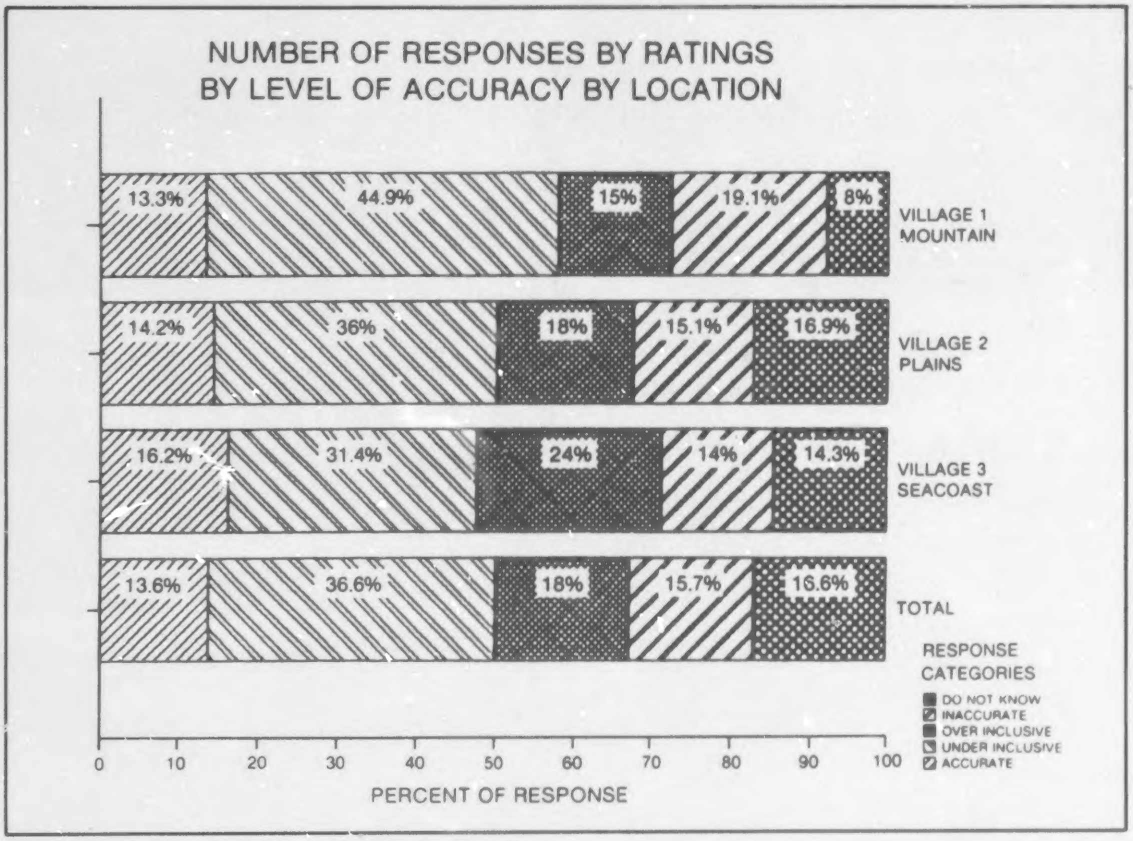


Figure 2. Responses x ratings x level of accuracy x location.

Figure 3 indicates the variation in accuracy as it relates to picture complexity.

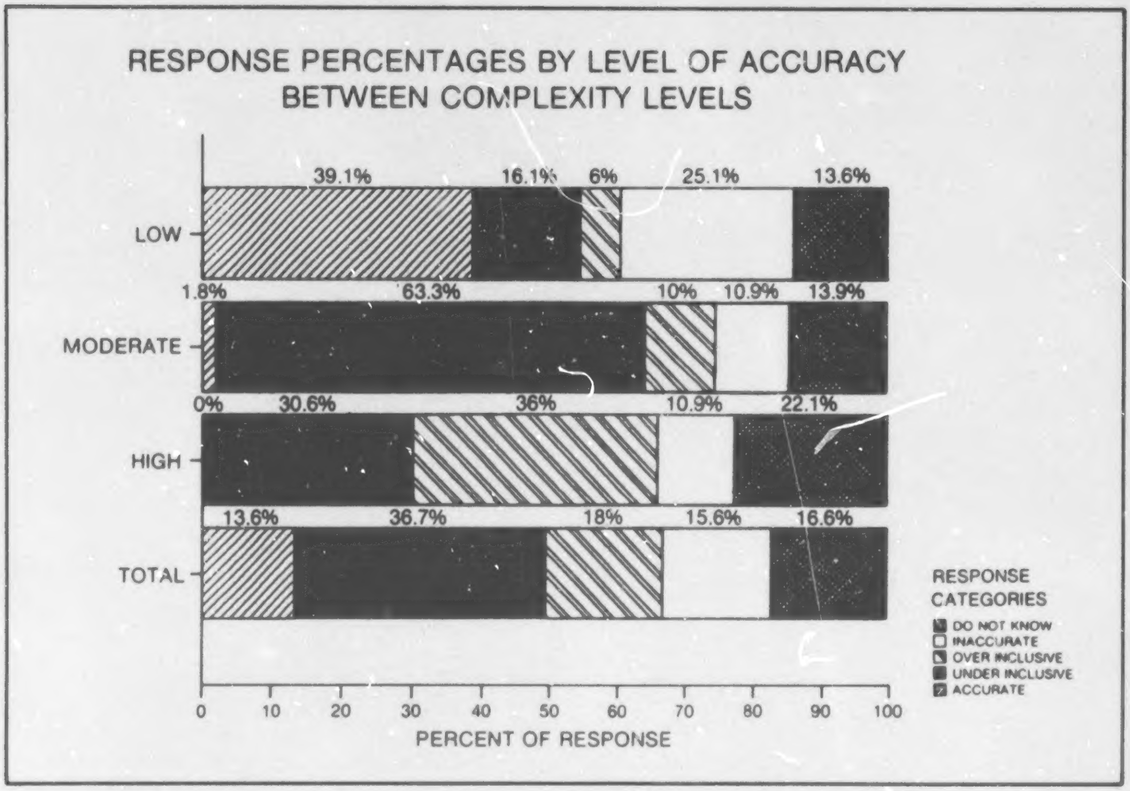


Figure 3. Response percentages by level of accuracy between complexity levels.

The age of women ranged from 15 to 80 with a mean of 39. They had attended school for a range of "unknown amount" to 8 years. Of the 32 (or 29%) who stated they had attended school, 15 stated they could read.

The need for pretesting stylized materials was indicated by several (Holmes, 1964; Hollant, 1975; and Fusell & Haaland, 1975), and the findings in this study were consistent with that need since the four localities did differ in their accuracy.

The picture "egg" was of low complexity, yet 32.7% reported accurately and 37% inaccurately. Inaccurate responses were other round objects (ball, moon) and other foods (onions, turnips).

"Mosquito" in the moderate complexity level was accurately described by 2.7%, and 71% were underinclusive or reported seeing only part of the picture. The enlarged mosquito was called a moon and circle.

The "latrine" series picture was in the high complexity and no responses were accurate. Thirty-five percent stated they did not know. The serial nature of the picture and the unfamiliarity of the latrine were considered reasons for the lack of accuracy.

## Conclusions

The analysis of the data indicated significant differences traceable to picture categories of content, picture complexity, and place of residence. The health/disease content category had a higher number of accurate responses than the cleanliness category. Differences were found between the three levels of low, moderate, and high complexity. The responses were more accurate with less picture complexity. Differences were also found among the village sites and between the villagers and the urban dwellers. The urban dwellers' picture recognition ratings were more accurate than the village dwellers. Higher ratings for those who had experienced schooling showed some traceable difference, while the age and employment factors showed no statistical significance.

The survey did provide contemporary baseline information about the visual literacy of selected Haitian village women. The results of a lack of visual stimuli in the villages were demonstrated since rural villagers who live in a media scarce environment did receive less accurate response ratings. These findings are important to health education methods which require the use of visual approaches.

Based on theories of visual literacy in developing countries, several writers presented data which tend to substantiate the interpretations in this study. Earlier studies by Hudson (1967) and Herskovits (1973, 1952, 1956) and more recent studies by Kwansa, Crone and Hunter (1972), and Holmes (1964) were all highly supportive of the need for study of visual literacy. The Hollant (1975) study in Haiti used similar methods (pictorial stimuli) and resulted in similar findings for pictorial abilities of rural subjects. There were men in the Hollant study and no comparison with rural subjects. The practical suggestions given by Fuglesang (1973) and Cook (1981) for development workers in Third World settings provided appropriate comparisons with this study done in one developing country with a high rate of general (verbal) illiteracy. The picture recognition abilities of village women in Haiti were found to be similar to many comparable Third World or developing countries.

## Recommendations

The pretesting of stylized educational materials intended for multi-site or multi-national use would appear to be a necessary prerequisite for development workers intending to prepare and/or use appropriate teaching tools. Specific knowledge of the visual literacy/illiteracy of villagers in Third World settings appears to be as important as the preparation and/or selection of visual materials. Although visual abilities are highly culturally related, there are methods to ascertain various aspects of visual literacy, such as picture complexity.

Specific recommendations are summarized as follows:

1) There is a need to understand pictorial illiteracy.

2) There is a need for research and pretesting.

3) If visuals are used, they should conform to the rules of simplicity and clarity; the objects/people should not be cut off; they should be familiar (clothes, symbols, and surroundings); they should be realistic in size.

Since schooling was not demonstrated highly important, health education workers could focus on the findings from the growing field of non-formal education and consider methods from the oral tradition. These might be supplemented with drama.

The study on a small number of village women in Haiti is similar to studies of the visual abilities in other developing countries and suggests areas to be considered by health education workers who wish to be effective teachers.

## Editorial Note

At the author's request, an extensive bibliography is listed, including items not referenced in the text.

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# MENTAL IMAGERY AND PARTICIPATORY INSTRUCTIONAL DESIGN

by

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George Bernard Shaw once said, "Few people think more than two or three times a year. I have made an international reputation for myself by thinking once or twice a week." Thinking is an ability that many people take for granted, and few teachers attempt to teach thinking as a skill. Yet, studies show that thinking can be taught and improved (Williams, 1983; Samson, 1975; Whimbey & Whimbey, 1975). Visual thinking and mental imagery are processes people can use for better thinking. What I have attempted in my teaching is to provide a method of practice for thinking by involving students in the instructional design process through mental imagery (Hortin, 1983).

There is a growing amount of research on visualization, mental imagery, and relaxation techniques that is applicable for teachers and students to improve learning. Ostrander and Schroeder (1979) describe the stress-free and fast learning technique of Georgi Lozanov called suggestology. Suggestology is a holistic approach to learning that uses relaxation and concentration techniques, visualization, Baroque music, and breathing exercises to learn foreign languages, memorize information, improve self-image, prepare for sports events, and solve intellectual and emotional problems. Simonton (1978) in his book, Getting Well Again, describes how positive attitude, relaxation, imagery, and exercise are used for treating cancer patients. Simonton (1978) describes how patients form mental pictures of white blood cells killing cancer cells and then carrying them out of the body through the liver and kidneys. In the mind's eye the patients visualized the cancer decreasing in size and the body tissue returning to normal.

Imagery can play an important role in education. Teaching with visualization can help students design materials, prepare for presentations, retain and understand information and gain control over their learning. Visual thinking involves seeing the external world, making visual representations of that world, and using the inner eye or exercising mental imagery. Mental imagery is the ability to create images in the mind to understand, remember, and enjoy experiences. We create images in our minds to organize, simplify, and explain our experiences. Our interpretations of those experiences are based on our ability to "see" external stimuli and use the "inner eye" to interpret and understand our world.

When we present information to an audience, we ask ourselves questions about the presentation and think about how information can be communicated. We not only (1) know the information, but we (2) consider how it can be presented, (3) who the audience is, (4) what possible outcomes are of presenting the information, and (5) how we will know if the message was received properly. I believe teachers and students can use mental imagery and participatory instructional design as a means to solving some of these questions by learning to "see" or "visualize" the instructional situations.

Participatory instructional design means that all people, that is, the instructional designers, teachers, and students become involved in the instructional design process at a more intensive level than is usually the case. It is a sharing of the thinking process with the rest of the class, a "participation" from all who are involved in the experience. Traditionally, instructional designers assess and analyze learner potentials and characteristics at some initial stage in the instructional design process. Instructional designers may also use a pre-test and post-test procedure to evaluate student performance and to judge the effectiveness of the instructional design system. However, although small samples of students may be involved at the nascent stage to help determine learner characteristics in the instructional design process, student involvement in decision making is minimal. Even pilot study inquiries, assessments of entering behaviors, or testing of prototypes are decisions controlled by teachers and instructional designers, not learners. Certainly, the management decisions, production, organization, implementation, and evaluation are levels of instructional design that rarely involve students directly. What I have done with my students is to bring them into all levels of the instructional design process through the use of mental imagery. This means that the students, as well as the teachers and instructional designers, become directly involved in the following: (1) needs and goals assessment; (2) preparing and determining learning experiences; (3) developing and producing media; (4) selecting methodologies; and (5) evaluating the learning that takes place.

In his book, Pedagogy of the Oppressed, Paulo Freire presents the theoretical foundation for this approach. Freire used photographs to encourage dialogue which resulted in action to bring about conscientization in the minds of oppressed people. Inherent in Freire's approach is the rejection of authoritarian teaching, a feeling of trust acquired through learners' participation, the seeking of truth, and a call for cultural expression and action. Through the development of communication skills in instructional media and the application of Freire's methodology, students learned to participate in the development of materials for teaching their peers.

Participatory instructional design is a result of careful planning on the part of the teacher and students. Here are seven steps that I use in participatory instructional design and mental imagery: (1) know the students, (2) explain the Freire approach to dialogical encounter, (3) know what it is the students want to learn, (4) design and produce the content using mental imagery (5) visually and verbally rehearse the presentation, (6) involve all the students in the presentation, activity, or learning experience, and (7) evaluate the experience.

## Knowing the Students

It is very important to figure out what students already know about the material and what they want to learn. A simple question and answer period, a discussion, some role playing, or a questionnaire should help them to find some common background and enable them to proceed to the new material in later sessions. Figuring out backgrounds and special needs of the students helps them reach the principle of transfer.

One of the oldest and most successful methods of learning is to proceed from the known to the unknown, using the background of the students to "transfer" old experiences to new experiences. They can do this by helping each other see similarities, differences, and relationships between the old knowledge and the new knowledge. Finding media or designing media for the transfer of knowledge is very beneficial. Obviously, students should design media materials which are at the level of the members of the class and are appropriate for helping them make the transfer.

## Freire Approach

Freire developed a philosophy of teaching and learning based on the conviction that every human being is capable of looking critically at the world in a dialogical encounter with others. Given an active, participatory role in education, a student could perceive his or her reality and be able to deal with that reality with confidence and dignity. The key to the Freire approach is active, rather than passive, involvement in learning. The students are not spectators but rather designers and presenters of media. Participatory instructional design allows the students to be involved directly at the management level. Why not allow students to organize, design, draw, script, and produce instructional materials for their peers? Asking students to become participants in instructional design allows them to learn how each thinks and learn how to learn.

## Knowing What It Is the Students Want to Learn

Obviously, as a teacher, you have some idea of what it is you want to communicate. However, the secret of participatory instructional design is to know what it is your students specifically are willing to change in terms of behavior, attitudes, or skills and to match the media produced to those objectives. Often teachers use media as a supplement or haphazardly gear their presentation around the media that they find available. This method may work or it may not. The best media are those that satisfy the needs of students and that are well integrated into the objectives that the students have established for themselves. Designing media rather than using commercially made materials gives the class more flexibility to match the medium to the objectives and to participate actively in a learning experience.

## Gathering and Producing Content Through Mental Imagery

The content of the presentation consists of the knowledge, skills, facts, and attitudes that the students research, simplify, design, produce, and present to their peers. Sometimes the whole class can be involved in this aspect and sometimes just two or three students. The students are the organizers of the information. They must learn to see, represent graphically in their minds the material that they plan to present, and visualize or generate visual imagery. In this way students are learning to observe, interpret, and classify the information they are hoping to design and present. The students are also learning to represent information visually, simplify it in some media form, and clarify their thinking about the information so that they can communicate their ideas to others. Finally, they are able to generate and manipulate the inner visual representations of their thinking process and translate these images into external representations so that they can be shared as materials for communication. Students learn visualization techniques to help them participate in the design process. Here are six steps that I ask my students to use in order to produce content through mental imagery:

1. Affirm your visualization abilities.

2. Assume a relaxed state through yoga, music, breathing exercises, or concentration.

3. Identify the idea, problem, and data you will treat.

4. Visualize the idea, problem, or data (internal representations).

5. Immediately write down, record, draw, sketch, or design the images you see (external representations).

6. Evaluate the instructional materials as a group.

Some advantages of involving students in the design of instructional materials are (1) students learn where to find information; (2) students compare how different students visualize information; (3) students organize the materials, and (4) students learn the skills of communicating that information to others (Hortin, 1983).

## Rehearsing the Presentation

After gathering content and designing materials for the presentation, the students should then rehearse the presentation both verbally and visually. Rehearsing the presentation will help them with (1) timing and smoothness in delivery, (2) self-confidence, (3) development of style, and (4) evaluation of the content. Mentally and physically rehearsing the presentation not only involves practicing what they are going to say, but also visualizing the performance. The students should get in a relaxed state of mind, imagine the room filled with their peers, and mentally go through the actual performance.

In the visualization experience they should "see" the performance from two perspectives. One perspective is from their own point of view; that is, they see or focus on their movements in the room, anticipate or "feel" the possible reactions of the audience, and concentrate on style and content. The second perspective should be as a third person, a member of the audience, watching themselves (the presenters). Here, they visualize their performance as others would see it. They must make these visualizations positive and control them in order to make them work. Style and content are important parts of visualization and are necessary considerations for a successful presentation. Style is confidence, smoothness in answering questions, and the establishment of a congenial, scholarly climate. In Oscar Wilde's play, "The Importance of Being Earnest," the character Gwendolen Fairfax says, "In matters of grave importance, style, not sincerity, is the vital thing." Style is definitely a plus for any presenter; although students cannot get by without good content, they will be more successful if they have both style and content. Visualization helps them develop a comfortable style, and it also helps them to "see" and evaluate the content.

## Involving the Audience in the Presentation

If students can involve their peers directly in the presentation, their chances for success are greater. Slides, overhead transparencies, flip charts, chalkboards, and graphic materials are excellent media for involving the audience through questions and dialogue. Interactive video and microcomputer software also provide opportunities for learner response. Learning centers are places for individualized experiences set up in the classroom that help students learn through various activities, assignments, and media and allow students to take responsibility for their own learning. Learning centers can be used to teach additional content, provide alternative assistance, meet special needs, reinforce content, test knowledge, and provide practice.

## Evaluating the Experience

After the presentation, students should evaluate the experience from the audience's point of view as well as their own. To evaluate the experience, students may use all of the following: tests, evaluation forms, discussion, their own reaction, the audience's reaction, feedback from questions and comments. They may find it easier to measure knowledge or skills than attitudes or feelings.

## Conclusion

To be successful, participatory instructional design students must organize and prepare. Generally, the more they involve their classmates in the process of planning and preparation, the more the class will benefit from the actual presentation. In selecting media, students must remember the principle of transfer. They should use visualization for designing of materials and for preparing the actual presentation to the rest of the class. Finally, evaluate during all phases of the instructional design process.

In conclusion, visual literacy proponents need to investigate the potential of mental imagery and participatory instructional design by carefully developing activities and research for future reporting.

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# IDENTIFICATION BY ART AND NON-ART MAJORS OF CONTENT, IMPRESSION, AND TECHNICAL FORM IN PICTURES

by
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## Nature of the Problem

Do people interpret visual information differently? If they do, are there common dimensions which define the way they "read pictures?" Visual concepts must be easily understood and communicated to be incorporated into instruction. Research in picture perception has produced conflicting information (Gibson, 1966; Haber, 1973). Empirical attempts to break photographs down into component parts for analysis have yielded inconclusive results (Shepard, 1967). Research paradigms currently being used, applied externally to photographs, have explained neither why viewers select certain visuals as more expressive nor how those visuals communicate their message. Reports from a previous study (McIsaac, 1983b) indicate that isolating and grouping selected aesthetic variables within an experimental research paradigm is premature. In this earlier study no consistent response was found to pre-selected aesthetic variables in the works of well known photographers. It appeared that the vocabulary used to describe those selected aesthetic criteria was not well understood. This prompted the question, "Would dimensional similarities become evident if respondents were allowed to choose their own categories and use their own vocabulary?"

The purpose of the present research was to determine whether there is a common dimension used by university art and non-art majors in categorizing and extracting meaning from photographs. If there is a common dimension, do the responses of these students with and without an art background differ along this dimension? An interdisciplinary approach suggests the use of anthropologic and linguistic paradigms to search for such an identifiable visual dimension and vocabulary.

An earlier paper (McIsaac, 1983a) explored the rationale for using the emic-etic paradigm. The emic model, sometimes referred to as New Ethnography, emphasizes studying human events from within. Units of meaning are examined and identified by internal analysis rather than through analysis of externally imposed classifications. Etic and emic are two very different approaches to data collection and are described in Pelto and Pelto (1970). Using the etic approach, external concepts are suggested and applied across cultures from an outsider's point of view. In the emic approach, values develop from within and begin to form patterns. It is in these developing patterns that discoveries are made which describe the particular behavior in question.

In the present study the emic model suggested eliciting categories of visual information from informants themselves rather than having the interviewer provide the categories to be used, as had been done in the previous study. The underlying assumption here is that people will best understand their own reasons and terminology. In previous photographic research, etic or externally identified variables have failed to uncover the rich information about human visual perception. This investigation, therefore, proposed that viewers themselves create structured meaning by sorting pictures. The object was to see whether there was consistent response among students to dimensionality and, if so, whether there was an observable difference between the way art and non-art majors sorted and categorized pictures.

## Method

*Subjects*. Fifteen university students ranging in age from 19 to 35 were chosen. They represented graduate and undergraduate art and non-art majors. Demographic information was collected from each student regarding age, sex, level of education, previous art or photographic experience and cultural background. Each subject was given 40 pictures and was told to sort them into any groups they desired. After the sorting task, subjects explained the reasons they grouped the pictures together. Their responses were tape recorded.

*Photographs*. One hundred photographs were originally selected. They were chosen to represent the widest range of categories; machines, people, patterns, animals, emotions, colors, abstractions, occupations, shapes, etc. They were all in color and of similar size. They included photographic techniques such as close up, medium shot, and long shot. These 100 photographs were used in a pilot study with 9 subjects. The 40 photographs which received the highest number of associations were selected for the final study. The variety of topics was maintained (see examples, Figure 1) and redundant photographs were eliminated. Each of the 40 pictures was laminated for durability.

*Procedure*. Subjects were interviewed individually. Each person was asked to complete a demographic profile. Forty pictures were then given to the subject with instructions to look at all the pictures, then sort them into as many groups as desired. No suggestions were made for categories. When the subject had completed the task, the number on the back of each picture was recorded by group. The subject was then asked to place the prototype picture, the one most representative of that group, on top. The number of the prototype picture was recorded. The subject was asked to describe why he/she grouped the pictures in that particular way. This interview information was tape recorded. Each interview took approximately 20 minutes.

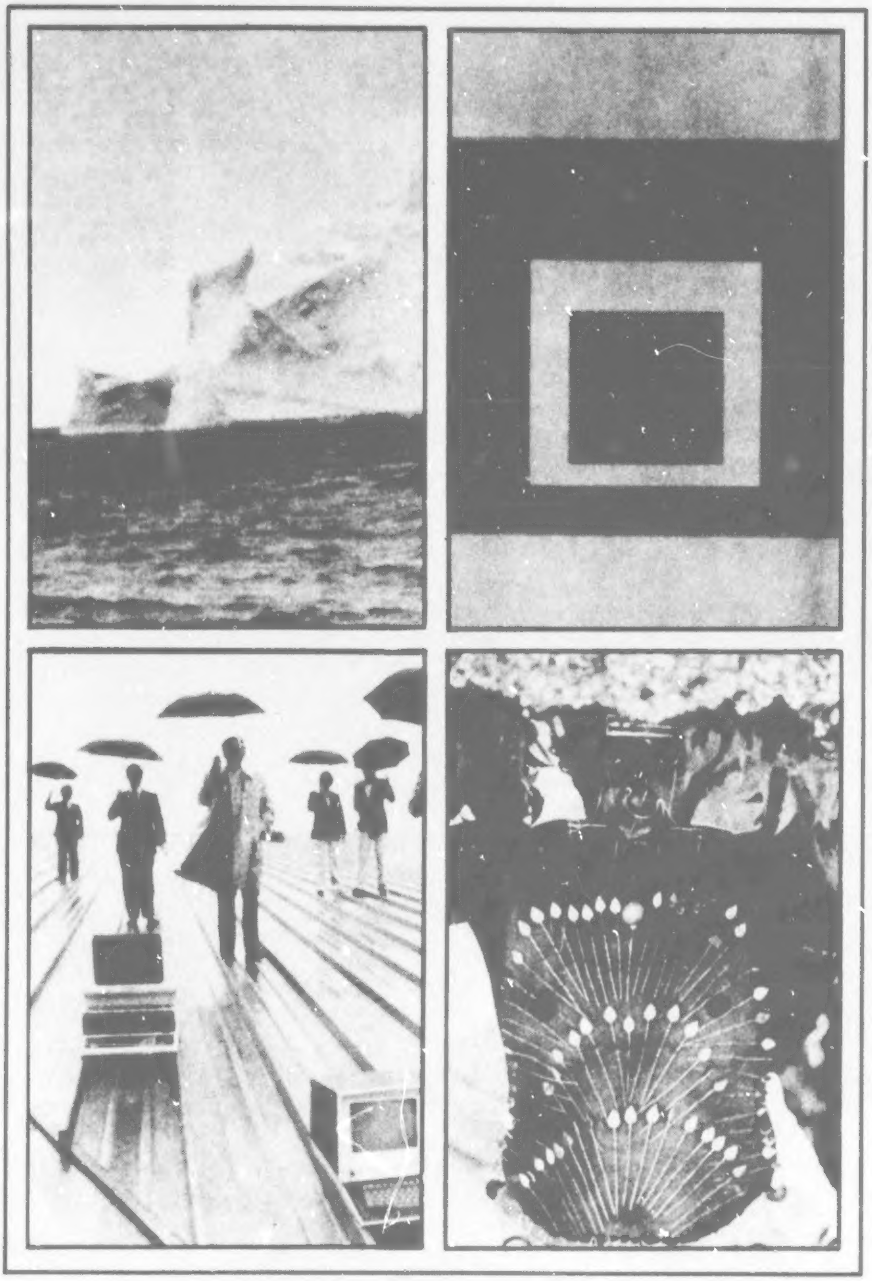


Figure 1. Selected photographs from final study.

## Results

Both numerical and interview information were used. Pictures which were frequently grouped together were examined and found to have visually similar characteristics. Information from individual interviews provided the conceptual base for categorical comparisons. An abbreviated table of comparisons is provided in Table 1.

Table 1

Picture numbers, related terms, and major areas of study for university students.

| ID | Pic. Nos. | Descriptive terms | Major |
|---|---|---|---|
| 002 | 20, 34, 35 | abstract landscape | art |
| 002 | 17, 14, 15 | photographer's way of abstracting | art |
| 002 | 13, 7, 11, 12, 18, 25, 37 | moods of people; happy wondering, angry | art |
| 003 | 3, 4, 10, 20 | perils of winter, cold | non-art |
| 003 | 17, 14 | computers, modern day man | non-art |
| 003 | 21, 2, 27, 28 | man's historical artistic endeavors | non-art |
| 004 | 20, 34 | designer landscape | art |
| 005 | 5, 6, 7, 8, 9 | pictures of people | non-art |
| 006 | 14, 24 | items not artifacts, cleaner, more intense | art |
| 007 | 34, 14, 15, 17, 20, 35 | abstract art; texture, rhythm and variety | art |
| 007 | 27 | gothic because of lightness and texture of drawing | art |
| 008 | 1, 24 | mud going in the water, pollution | non-art |
| 008 | 36, 5, 37 | poor people, don't have any place to go | non-art |

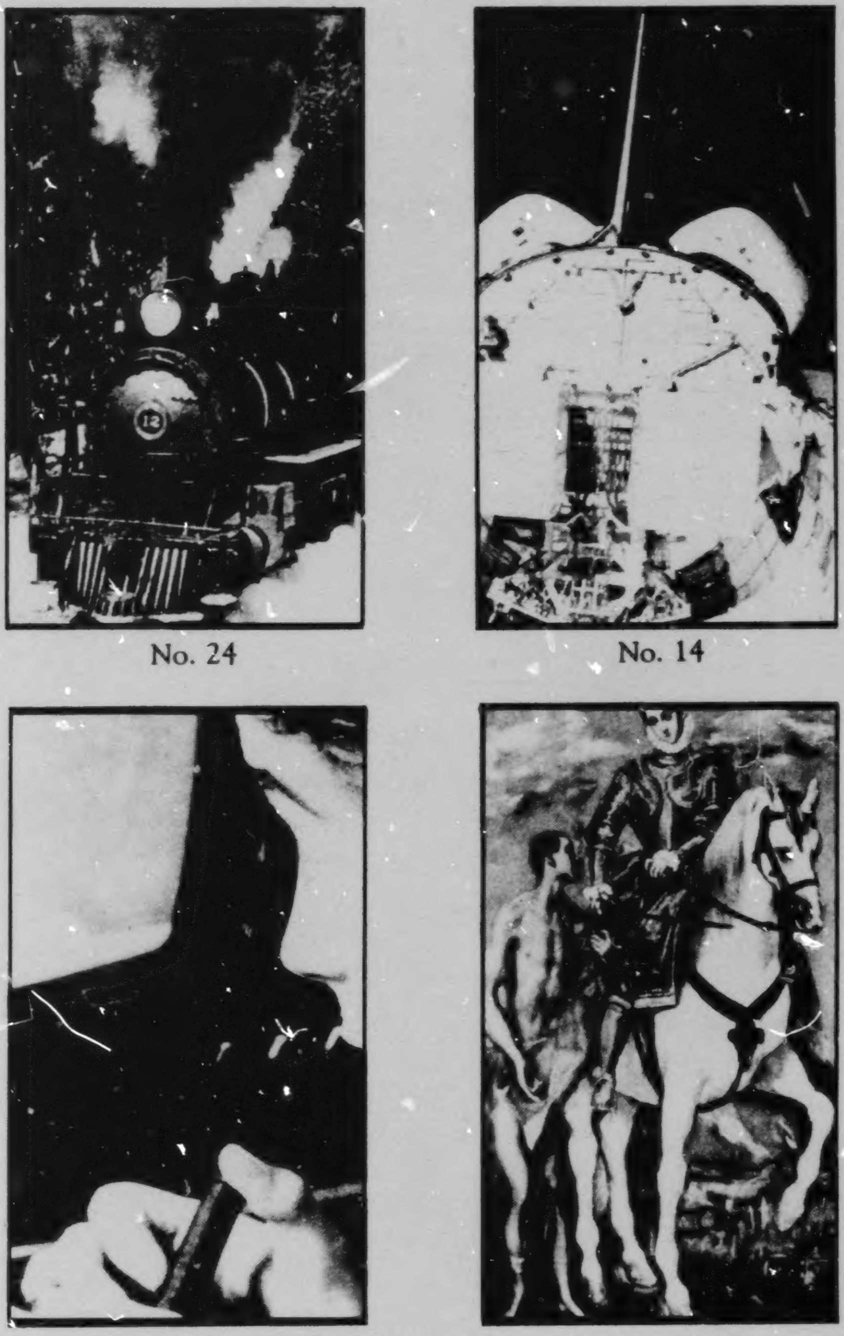
Table 1 lists picture numbers, related terms and major areas of study for students participating in the study. A representation of those pictures having high degrees of association were included.

Descriptions such as, "items not artifacts, cleaner, more intense"; were used with pictures numbered 24 and 14 respectively, by art majors. Non-art majors described those same pictures as, "pollution" and "modern man. "Picture number 11 was seen by art majors as, "moods of people, happy, sad, wondering, angry" and by non-art majors as, "groups of people in motion." Picture number 27 was described as "gothic because of lightness and texture of drawing" by an art major and as "man's historical artistic endeavor" by a non-art major (Figure 2).

In this study, the terms used by art and non-art majors to describe the pictures they had categorized differed predominantly along a literal/non-literal dimension. Most respondents interpreted the visual information by consistently assigning the pictures either literal or non-literal meanings. Interpretations appeared to be related to whether the student had or did not have art training. There was consistent use of each individual's own type of schema. The most frequent literal dimension appeared to be one of content (people, animals, and machinery). The most frequent non-literal areas were impression (ideas of beauty, feeling, and emotion) and technical form (shape and design). These results are consistent with the results of studies in art education (Engel & Hausman, 1981) which conclude that a person's interpretation of visuals is severely limited when artistic or aesthetic education is missing. Art education, which includes instruction in technique, expands a student's awareness of form, shape, and texture. This expanded awareness, it is suggested, allows the viewer to move beyond the literal interpretation of a picture and to explore a greater variety of meanings. The literal/non-literal interpretations of pictures in this study illustrated the dimensional differences which exist between the way university art and non-art majors categorized visual information.

## Discussion

The present study marked an improvement in strategy over the previous one (McIsaac, 1983b). In the earlier study, in which the variables were pre-determined, no similarities were found in the way students grouped pictures. In the present study when dimensions were allowed to emerge from individual sorting, there was a difference observed along the literal/non-literal dimension. This difference appeared to be related to the difference in art background between students. Those with an art background had a more sophisticated schema for interpreting visual information. Indications from this exploratory study are that dimensional similarities exist and can be observed. This suggests further inquiry into those cognitive dimensions used by viewers to categorize visual information. Future studies should include tighter quantitative methods such as factor analysis or multidimensional scaling to uncover further dimensional relationships. Replications could produce a robust measure of dimensionality. Indications are that systems of categorization are determined not only by an individual's artistic and educational background but also by his/her cultural background. Future studies should examine cognitive dimensionality as it relates to various educational and cultural settings.


No. 24

No. 14

No. 11

No. 27

Figure 2. Pictures having high degrees of association.

Photographers and graphic artists have often cared more for the inherent characteristic of their work than its communicative value. Uncovering dimensions meaningful to viewers can help the visual artist design materials which will appeal to the intended audience. If a designer portrays the visual message using a dimension to which the viewer is receptive, the message becomes clear and unambiguous. This should result in the production of more appropriate and effective visuals for instruction.

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# VALIDATING VISUAL LITERACY EXPERIENCES A FIVE-YEAR AFFECTIVE STUDY

by

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This paper deals with the long term affective changes created by exposure to a course dealing with the grammar of visual literacy and is one part of a three-part study. The first part dealt with a confirmation that there had been significant changes on a cognitive or factual level due to the course, and this was done by administering a pre- and post-course test which in part demonstrated the growth in cognitive skills. The second part was a survey which utilized a pre- and post-term questionnaire to reflect positive attitude changes before and after the course. This third part is an extension of the one semester study and was sent to a computer-generated random sample of students who had taken the class within the previous five years.

The main focus of this study is an examination of the long-term effects on student attitudes wrought by a freshman level course called Introduction to Art given at Burlington County College in New Jersey. This course deals with elements and grammar of visual language and their use in creating holistic visual sentences or compositions.

It is a well known fact that students forget a large percentage of the cognitive material covered in a course within a short period of time unless it is used immediately. What does survive for a longer period are the attitudes generated by the experience. In spite of this knowledge there is a prevailing disposition to emphasize content material, at the expense of developing strongly positive attitudes towards learning. Positive feelings towards learning, coupled with skills in information gathering and processing are the keys to life-long learning. The sole benefit of many learning experiences in school is the grade at the end of the term. Students are hardly aware, with any degree of certainty, of any other benefits that they have derived from a course.

The aim of this three-part study was to demonstrate how we may increase acceptance of the value of visual literacy experiences by carefully objectifying and statistically validating cognitive and affective student behavioral changes. The course's overall goal is to develop greater student pleasure and confidence in visual experiences by increasing cognitive ability to verbalize and aesthetically articulate perceptions and feelings about visual works of art. Although traditional art works serve as the main vehicle for presenting cognitive material, every opportunity is utilized to illustrate application of these concepts in everyday experiences from body decoration to consumer or commercial uses. In this manner students more clearly see the "logic" of visual language and the need for a greater understanding of the visual world around them.

To develop goals the investigator chose to utilize Krathwohl, Bloom and Masia's *Taxonomy of Educational Objectives--Handbook II Affective Domain* to generate a hierarchy which would reflect the levels of complexity in the area of feelings toward the subject matter. The goals begin at a simple level of functioning and progress to the higher or more complex levels of behavior. Lacking only a specified level of proficiency at this stage, they are specific goals rather than definite objectives with exact levels of acceptable behavior.

### Willingness to Receive

The student will demonstrate an increased *willingness* to tolerate new or unfamiliar forms of art, such as "Pop Art."

### Willingness to Respond

The student will demonstrate an increased *willingness* to *voluntarily* look at works of art in art galleries and in magazines.

### Satisfaction in Response

The student will demonstrate an increased sense of satisfaction when responding to works of art.

### Acceptance of a Value

The student will demonstrate an *increased appetite* or taste for what is generally considered good art in the sense that she realizes it has value for her.

### Commitment to a Value

The student will demonstrate an increased commitment to seek out new visual experiences by visiting art museums or by developing latent artistic talent because he/she considers it an important part of the development of a well-rounded person.

### Conceptualization of a Value

The student will demonstrate an increased desire to discover and crystallize the basic ideas an artist is suggesting in an admired work of art.

### Organization of a Value System

The student will demonstrate an increased *desire to organize* the various interrelationships within a work of art with the intent of being able to assess which are dominant and which are subordinate in the artist's conception.

## Preference for a Value

The student will demonstrate an *increased preference* for aesthetically appropriate choices in the arrangement and use of ordinary objects in his/her environment.

These sample goals were used to create a short term questionnaire that was administered at the beginning and the end of one 15-week semester. To demonstrate the overall pronounced shift in positive behavioral changes a bar graph was developed to illustrate attitudes before and after (see Figure 1). A scale of five possible responses, number 1 being the most negative and number 5 being the most strongly positive, was used. The post-test illustrates greatly increased positive feelings toward art.

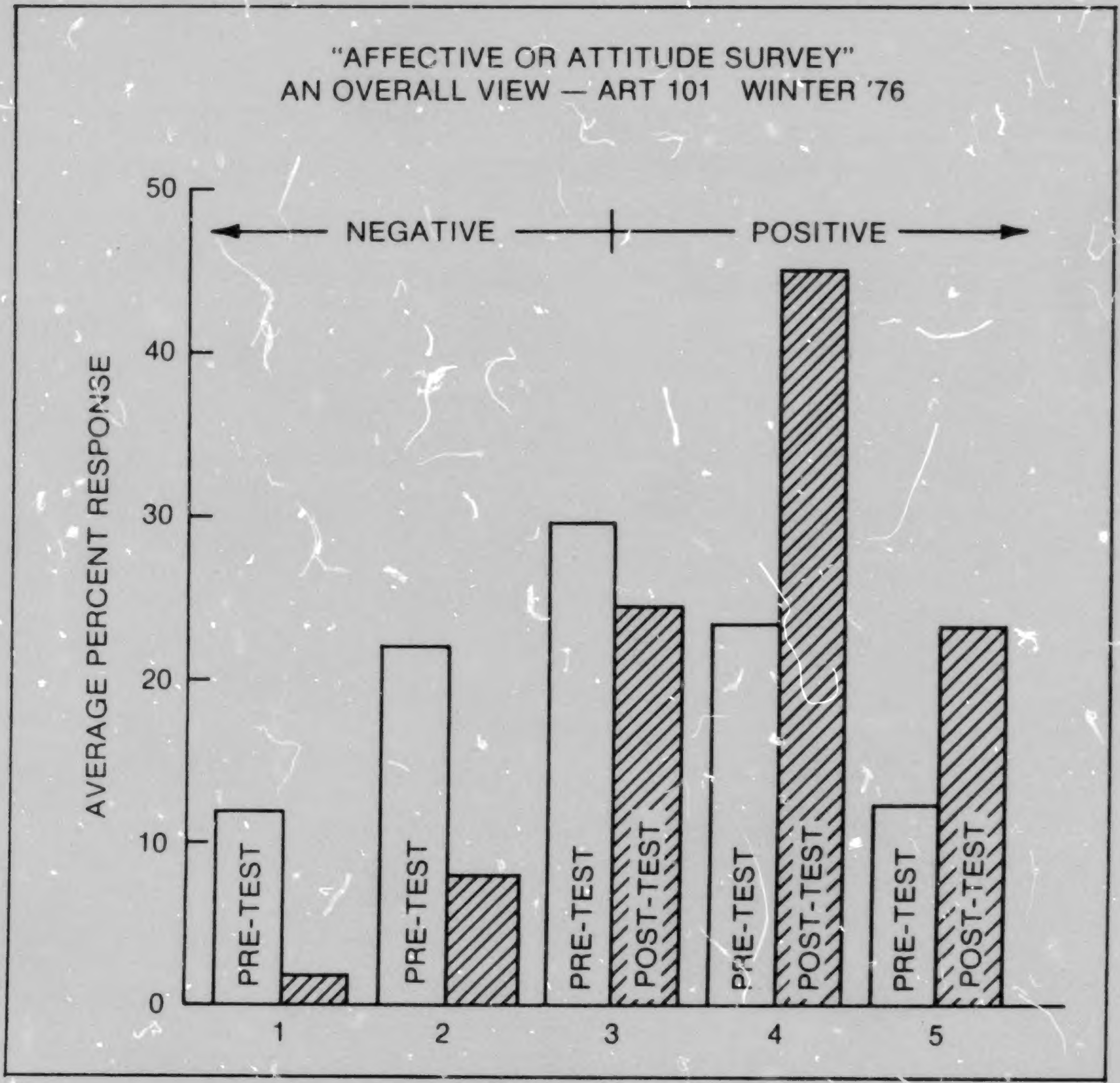


Figure 1. Bar graph illustrating shift in positive behavioral changes.

This is particularly significant in a class like Art 101 which is regarded by many students as required but not relevant to their needs or their major areas of interest. There is an absolute need to convince students of its value to them or little can be accomplished. A great deal of energy is expended to show the practical and vital relationships between the visual arts and everyday life and how the understanding of the grammar and structure of the arts greatly improves our visual literacy and sensitizes us to information of which we are only marginally aware.

## Affective Validation/Five-Year Longitudinal Study

The strength of the short term positive behavioral changes experienced by the students after Art 101 posed a tantalizing question. The problem was how long-lived were the perceived changes and how much would they diminish as time passed. As a general rule feelings about an experience can be expected to somewhat diminish in strength with the passage of time.

To answer the question, a survey was developed which would update the earlier study and indicate how much erosion had occurred. The survey questionnaire (see Figure 2) had an inset identifying the affective objective being tested.

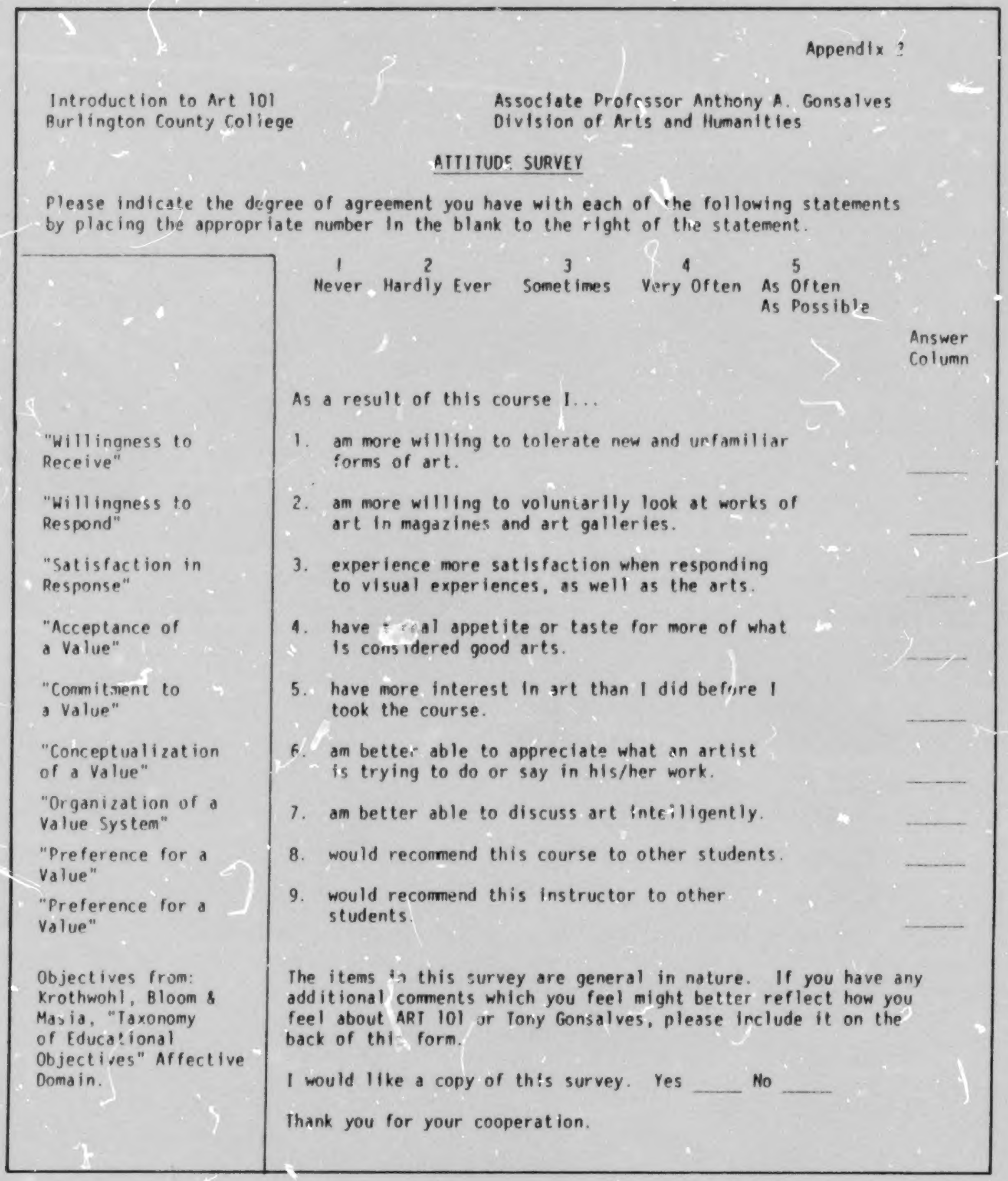
Joy Hughes, Chairperson of the Division of Educational Evaluation and Development at Burlington County College, graciously acted as the impartial arbiter of the mail survey returns, as well as the computer-generated statistical information.

The question being asked was, "Are the verified short-term behavioral gains of a more permanent nature?" The response clusters created by the linear graphs (see Figures 3-5) clearly indicate a maintenance of a high level of positive feelings about art.

Generally speaking, the graphs indicate some return to the similar negative levels reflected in the earlier pre-test, but surprisingly enough there was no decrease in the percentage of students who felt strongly positive about the Visual Arts as a result of Art 101.

There was a realignment of attitudes for the students who were moderately interested or interested very often. Column number 1 diminished from 44% on the post-test to 30% on the five year survey, but there was an increase in the moderately positive responses from 24% (post-test) to 35% on the five year survey. Clearly the average student felt a little bit more conservative about his earlier strong feeling but still was favorably disposed toward experiences in art.

The scores indicate that as a result of Art 101 most students felt an increased willingness to tolerate new or unfamiliar forms of art and experience more satisfaction when responding to art works because they felt better able to appreciate what an artist is trying to say in his work. They have an increased



Appendix 2

Introduction to Art 101
Burlington County College

Associate Professor Anthony A. Gonsalves
Division of Arts and Humanities

ATTITUDE SURVEY

Please indicate the degree of agreement you have with each of the following statements by placing the appropriate number in the blank to the right of the statement.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Never | Hardly Ever | Sometimes | Very Often | As Often As Possible |

| | | Answer Column |
|---|---|---|
| | As a result of this course I... | |
| "Willingness to Receive" | 1. am more willing to tolerate new and unfamiliar forms of art. | ______ |
| "Willingness to Respond" | 2. am more willing to voluntarily look at works of art in magazines and art galleries. | ______ |
| "Satisfaction in Response" | 3. experience more satisfaction when responding to visual experiences, as well as the arts. | ______ |
| "Acceptance of a Value" | 4. have a real appetite or taste for more of what is considered good arts. | ______ |
| "Commitment to a Value" | 5. have more interest in art than I did before I took the course. | ______ |
| "Conceptualization of a Value" | 6. am better able to appreciate what an artist is trying to do or say in his/her work. | ______ |
| "Organization of a Value System" | 7. am better able to discuss art intelligently. | ______ |
| "Preference for a Value" | 8. would recommend this course to other students. | ______ |
| "Preference for a Value" | 9. would recommend this instructor to other students. | ______ |

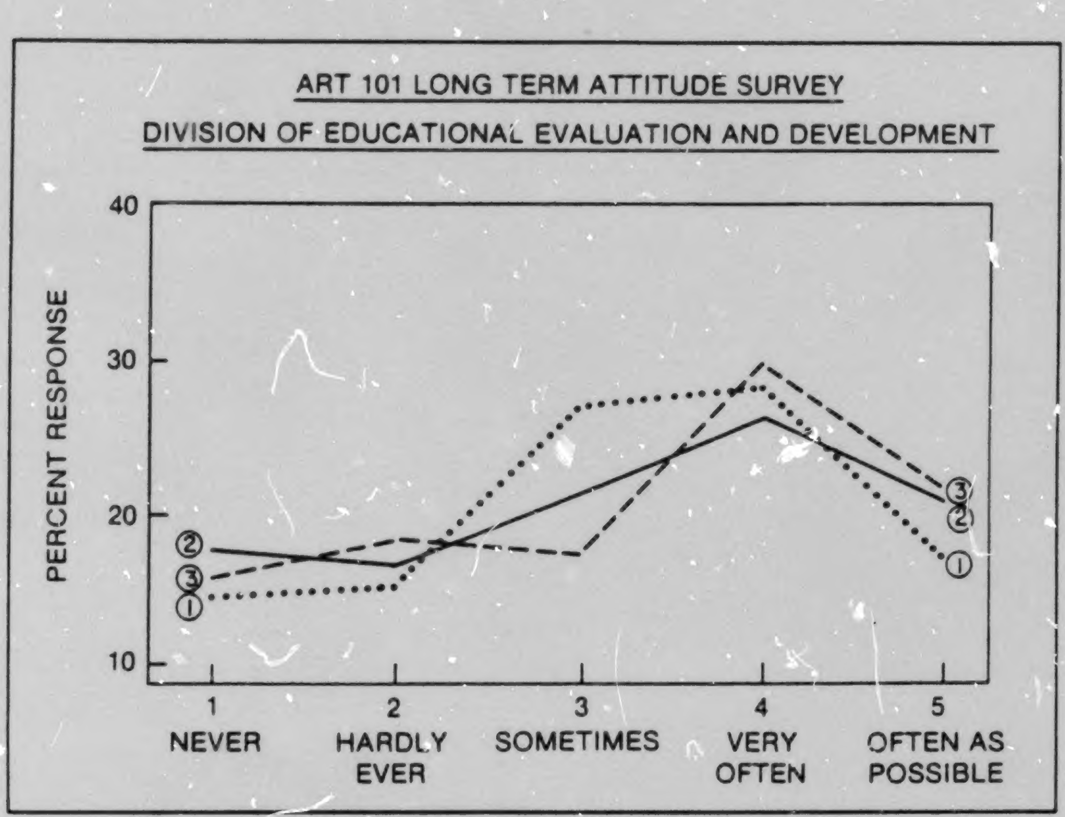
Objectives from: Krothwohl, Bloom & Masia, "Taxonomy of Educational Objectives" Affective Domain.

The items in this survey are general in nature. If you have any additional comments which you feel might better reflect how you feel about ART 101 or Tony Gonsalves, please include it on the back of this form.

I would like a copy of this survey. Yes _____ No _____

Thank you for your cooperation.

Figure 2. Survey questionnaire.



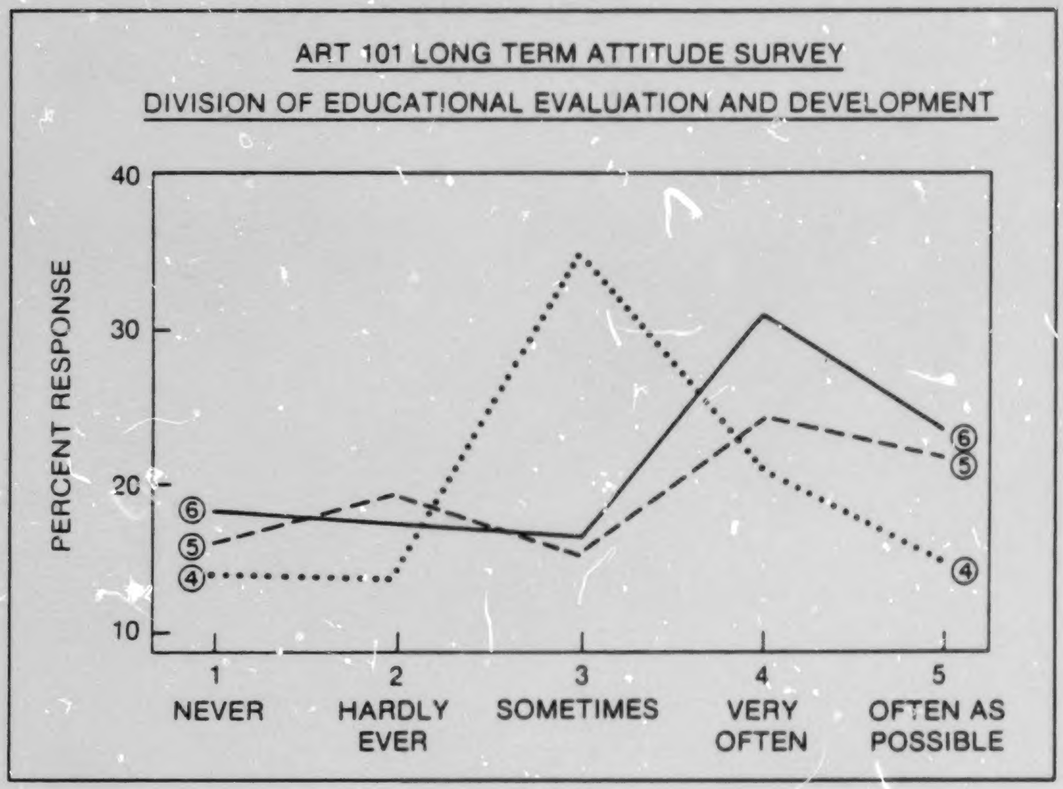
The numbered lines above illustrate the student responses (over a five-year period) to survey questions listed below:

1 - am more willing to tolerate new or unfamiliar forms of art. (Krathwohl - "Willingness to Receive")
2 - am more willing to voluntarily look at works of art in magazines and art galleries. (Krathwohl - "Willingness to Respond")
3 - experience more satisfaction when responding to art works. (Krathwohl - "Satisfaction in Responses")

Explanatory notes:
1 and 2 represent minimal levels of acceptance but illustrate a definite maintenance of long-term positive feelings generated by Art 101. The short-term study (see Appendix 1) initially indicated a reasonably strong negative feeling about taking the course and being exposed to the subject.

3 represents a somewhat higher level of acceptance and the beginning of internalizing of the new values. Over 50% of the respondents indicated strong positive feelings, but conservative reluctance to enjoy these new feelings is also illustrated.

Figure 3. Art 101 long term attitude survey--questions 1, 2, and 3.



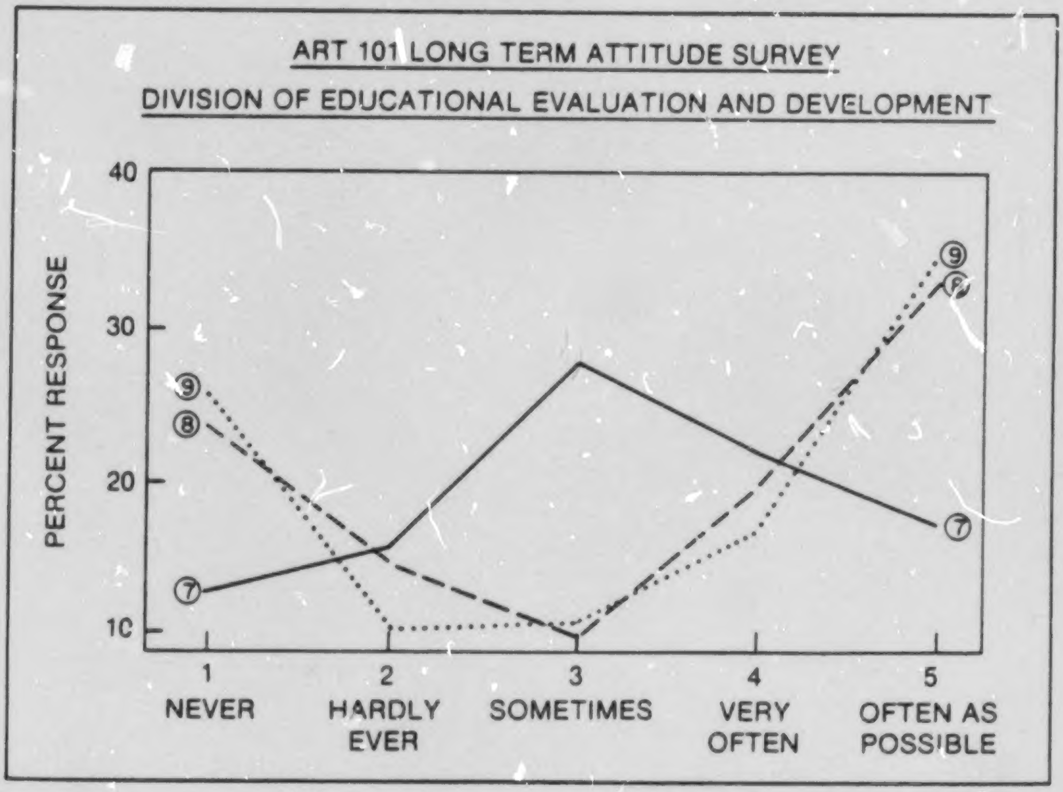
The numbered lines above illustrate the student responses (over a five-year period) to survey questions listed below:

4 - have a real appetite or taste for more of what is considered good art. (Krathwohl - "Acceptance of a Value")
5 - have much more interest in art than I did before I took the course. (Krathwohl - "Commitment to a Value")
6 - am better able to appreciate what an artist is trying to do or say in his/her work. (Krathwohl - "Conceptualization of a Value")

Explanatory notes:

4, 5, and 6 illustrate a definite and positive acceptance of the values generated towards art on a much higher level, but also that most students understandably assume positions short of absolute acceptance and commitment to these new values. To expect students to demonstrate attitudes of that magnitude would generally be unrealistic in most situations.

Figure 4. Art 101 long term attitude survey--questions 4, 5, and 6.



The numbered lines above illustrate the student responses (over a five-year period) to survey questions listed below:

7 - am better able to discuss art intelligently.
(Krathwohl - "Organization of a Value System")
8 - would recommend this course to other students.
(Krathwohl - "Preference for a Value")
9 - would recommend this instructor to other students.
(Krathwohl - "Preference for a Value")

Explanatory notes:

7 represents a definite and positive acceptance and an internalizing of these new values on a very high level and, again, the number of students willing to demonstrate absolute acceptance and commitment is somewhat less.

8 reflects some of the lingering negative feeling felt before Art 101, over having been required to take a course of perceived minimal value, but it also maintains a reasonable positive commitment to share the value of Art 101 with peers.

9 reflects some of the lingering negative feeling towards the instructor as a focal point of this required experience. More importantly, it demonstrates that the definite, positive affective changes are more likely the results of the course experience and not of any strong affection for the instructor.

Figure 5. Art 101 long term attitude survey--questions 7, 8, and 9.

appetite for what is considered good art and as a result are more willing to voluntarily look at works of art in magazines and art galleries. There is more interest in art as a result of Art 101.

An overall view verifies the fact that students tend to draw back to more conservative and less exposed feelings as time passes, but more importantly, the graph indicates a continued positive commitment to the Visual Arts as first indicated in the post-test. Apparently this five year study indicates that the reasonably strong negative position held by many students before Art 101 has generally been changed to a more open and satisfying affective outlook.

## Conclusions

Is the whole idea of objectifying visual art experiences heresy? Who benefits and what are the dangers?

One of the considerations which plagues those of us dealing with the visual arts and visual languaging in general is that they are perceived as being quixotic and without structure. When we feel that these experiences are so ethereal that they cannot conform to any sense of organization we deny the whole idea of visual logic and do not bother to try to untangle what appears to be a confusing visual hodge-podge for our students.

Certainly, we can untangle the cognitive or factual concepts dealing with the elements and grammar of visual languaging if we care to analyze and organize what creates "cohesive visual sentences." We can emphasize situations which help students to understand and appreciate not only favorable and pleasant visual experiences but also the powerfully negative. What we don't understand we very often reject, so it is critical that we feel some sense of security in these non-verbal, emotional, and sometimes complex experiences.

The cognitive pre- and post-test scores certainly reflect a great increase in intellectual understanding. The long term affective responses reflect a greater willingness to continue to grow and explore what was originally regarded with a great deal of suspicion and doubt.

One of the dangers to be avoided is the desire of many students to create strict and inflexible rules of acceptability or to ask the teacher to present them. Students must be continuously encouraged "to keep things open ended" and to enjoy new, challenging, and justifiable perceptions. On this point the Affective Surveys reflect a reservation to "go all the way" and although there is a consistent increase in "willingness to accept" and to value these new ideas and attitudes, there is the understandable unwillingness "to go all the way." Absolute commitment for people not professionally or emotionally involved in the visual arts would be an unrealistic expectation.

As a teacher at Burlington County College, I have found that these studies have endowed this "art appreciation course" and me with a quality of academic and professional credibility that was somewhat reserved before. As with any teacher who embarks on "crystallizing" and refining what he regards as ideal student exit skills and attitudes, I have found that these studies helped me to identify and achieve goals that I felt were important for my students and my professional growth. I, incidentally, was promoted to Full Professor here at B.C.C., in no small measure because of these studies and their supportive course work.

However, a very great danger a study of this kind could pose is that it be used as a sacrosanct instrument to judge and evaluate the performance of other teachers. I, personally, have found the whole approach to clarifying (or objectifying) my goals and validating them as an invaluable method of eliminating treasured but non-essential bits of information and ideas from my course. It would be a limitation of academic and moral freedom for supervisors to use studies of this kind to force compliance.

Last, but not least, another positive function work of this kind can serve is to protect the integrity of art and visual literacy courses by making it manifestly clear to students, teachers, school administrators, and the public alike, that these courses are valid and valuable contributions to a truly balanced education. They are not just pleasant "frills" which can easily be cut from school programs and budgets without much loss to the curriculum but are that part which trains students to be visually literate and effective in an increasingly complex visual world.

# AUDIOVISUAL MEDIA UTILIZATION BY SCHOOL OF EDUCATION FACULTY AT INDIANA UNIVERSITY (BLOOMINGTON)

by

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In a provocative article, "Evaluating the Use of Technology in Education," Anandom and Kelley (1981-82) suggest that three major phases of an innovation-diffusion process be considered: Extensiveness, Effectiveness, and Endurance. Here are their definitions.

> Extensiveness refers to how widespread is the use of technology in education; effectiveness refers to improvement in human (faculty and student) satisfaction and in student motivation, retention, and learning; and endurance refers to the long-lasting continuation of an innovation.

Accepting these definitions, let's consider each starting from the last one and moving up.

## Endurance: How Long-lasting Are Innovative Technological Developments?

As educators, each of us has seen numerous technological innovations burst upon the scene promising to be the panacea to cure all education's ills, only to fizzle out and give way to yet another new technology. As commonplace as this personal observation has been, it has only infrequently been documented by systematic research.

Taylor and DiPaolo (1978) revisited the Project Discovery Schools and discovered that 10 years later teachers in these experimental schools were still heavy users of media and continued to integrate such materials as an essential part of their day-to-day lesson planning. These teachers reported, "Availability means nothing; accessibility is everything!"

Cawelti (1967) reported on a national survey of 7,237 accredited high schools where, state by state, schools disclosed how many of 27 important innovations they had accepted or rejected.

With the exception of language laboratories where about three-fourths of the schools reported using them, new technological devices appeared to be receiving only limited use. Programmed instruction was reported in use in about 29 percent of

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the schools and had been abandoned by 5 percent. About 17 percent claimed regular use of open and closed circuit television with about 4 percent abandoning it after try-outs. Newer innovations such as teaching machines, telephone amplification, and simulation or gaming were in limited use.

While almost half the schools indicated adoption of such new curriculum innovations as SMSG mathematics, PPSC physics, and one of the two major chemistry programs, the sample schools reported an average of fewer than two technological innovations out of the seven choices included in the survey.

Surprisingly, these authors were unable to locate any comparable published studies of higher education institutions' practices concerning the adoption and/or abandonment of instructional technology. This appears to be a research area in dire need of study.

### Effectiveness: How Valuable is Media in Increasing Learning?

Next, let's consider evidence concerning the second E, Effectiveness. What can we conclude about research evidence on effectiveness of the use of technology in education?

First, we must acknowledge that research evidence is at best equivocal. However, in major reviews of evaluative studies, Allen (1959), Silberman (1982), Lysaught and Williams (1963), Schramm (1964), and Moldstad (1974) seem to agree that such researches confirm: (a) that students can learn effectively, often more effectively, than from more conventional instructional stimuli; and (b) that generally the students learn equal amounts in far less time.

Recent meta-analyses emphasize even more clearly that as we learn more about applying a "system approach" to designing multimedia learning stimuli, we get consistent statistical results in favor of such approaches over traditional lecture-discussion treatments.

Fisher and MacWhinney (1976) reviewed autotutorial research between 1962 and 1975 and report marked superiority for this approach:

> The single most striking observation emerging from this review is the cumulative evidence to suggest that A-T instruction may often be more effective than the lecture method in producing student achievement as measured by performance on written examinations. These findings differ markedly from those of previous investigations comparing teaching methods. In contrast, only one of 44 comparisons reviewed here favor the lecture method of instruction, while more than two-thirds attribute superiority to the audio-autotutorial approach, with 18 of these finding the difference to be significant at $p = .05$ or less (p. 251).

In their reviews of 59 studies comparing computer-based college instruction with conventional instruction, Kulik, Kulik, and Cohen (1980) reported small but significant advantages for CBI.

> Thus, the typical student in a computer-based class scored at the 60th percentile on an achievement examination over course material, whereas the typical student in a conventional class scored at the 50th percentile (p. 538).

> In individual studies, there were notable exceptions to the general rule of small effects of the computer on student performance and attitudes. In a few applications, the introduction of computer-based instruction into a college classroom dramatically influenced student examination performance; class averages on final examinations rose by 15-20 percentage points in these cases (p. 538).

Perhaps the most consistent finding regarding these comparative media studies related to the savings of instructional time on the part of the learner.

Early studies by Wendt and Butts (1960) concerning use of instructional films in learning U. S. history; Attiyeh, Bach, and Lumsden's (1969) nationwide experiment concerning the efficiency of programmed learning materials in teaching economics; and Fitzpatrick's (1970) report of the use of a multi-media program to teach U. S. Naval Cadets basic economics document impressive time-on-task savings when compared to traditional lecture-discussion approaches.

Kulik, Kulik, and Cohen (1980) reaffirm this dramatic finding in their meta-analysis of computer based studies:

> In every study in which computer-based instruction substituted for conventional teaching, the computer did its job quickly--on the average in about two-thirds the time required by conventional teaching methods. It is clear that the computer can function satisfactorily in college courses and at the same time reduce time spent in instruction (p. 538).

### Extensiveness: How Widespread is the Use of Media?

Finally, what about the first E, extensiveness of media usage? This is another research area for which we have embarrassingly little data--and much of what we have is suspect!

It seems almost criminal that with all the federal programs which have earmarked funds of library and audiovisual software and hardware, the latest U. S. national study to survey overall utilization patterns in elementary and secondary schools was done in the early 60's by Godfrey (1967).

Notice that in the Godfrey study when elementary and secondary teachers were asked to list the type of audiovisual medium used most frequently and the number of times used per semester, 50-75% of the teachers indicated they had used their favorite medium 9 or less times per semester!

As a result of this and other early studies, the President's Commission on Instructional Technology (Tickton, 1970), concluded:

> In American schools and colleges today the major source of instruction other than the teacher in person is the book, plus such immemorial accessories as charts and blackboards. Some experts put the figure of media usage at 1% or less (p. 21).
>
> Today technology touches only a small fraction of instruction. Colleges, universities, and schools have been using television, films, computers, or programmed texts in instruction, but to a limited extent. The results are mixed, with some institutions making a creative and sustained use of the new media while others, after an initial burst of enthusiasm, quickly lose interest. (p.6)

What do more recent research surveys show concerning classroom media usage? Since the study we are reporting on shortly deals with higher education, in fact our own Indiana University School of Education, let's concentrate on utilization studies concerning college and university faculties.

Several earlier studies are worth mentioning from a historical perspective. As early as 1951, Kurth surveyed eight midwest universities to find out what audiovisual resources were available to School of Education faculties, which ones they used, and what additional audio-visual resources they desired. Of 152 faculty respondents, 97% used at least one medium; and, in general, 60% used at least four types of audiovisual materials. Films and graphic materials were most frequently used and 73% reported making their own audiovisual materials.

In 1960, Hubbard analyzed reasons behind the limited use of audiovisual materials at Syracuse University. Major deterrents reported were: (1) classrooms inadequately set-up for media use, (2) difficulty in obtaining materials and equipment, and (3) lack of appropriate materials.

Beers (1971) collected data from 345 faculty members and 478 student teachers on 11 campuses of the State University of New York. Major deterrents to greater use of audiovisual materials were reported as: (1) inadequate classroom facilities for the proper use of audiovisual materials and (2) lack of sufficient budget for audiovisual materials.

The range of film utilization was from zero to 30 times per semester per faculty member with 48% using from one to five films per semester; however, 22% did not use films.

During 1974-75, the Media Research Division of the National Film Board of Canada (Cruickshank, 1975) surveyed 1,600 teachers on all levels of education throughout the provinces. With permission, we have included their chart showing the mean number of times each of seven audiovisual formats were used during the 1974-75 school year (Figure 1).

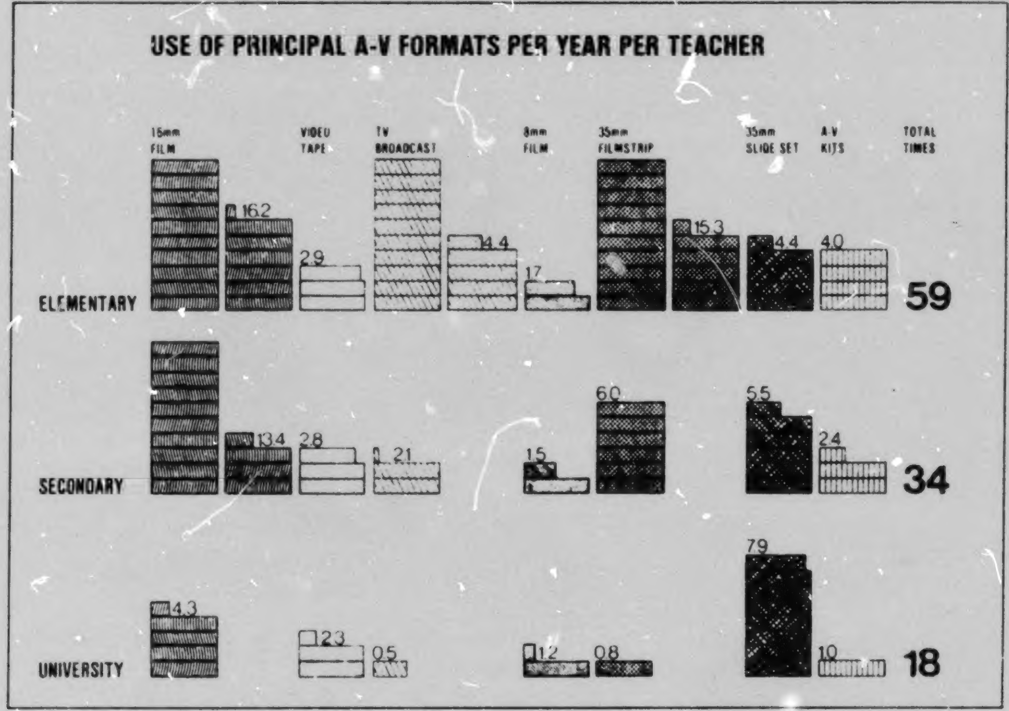

Figure 1. National Film Board of Canada Survey.

When indicating the number of films used per teacher per year in 23 specific teaching areas, the instructors reported an average of 15 or more films used in 11 out of 23 teaching specialities. Natural science teachers averaged 35 films per year while sociology teachers reported 31 and history teachers, 28. Forty percent encouraged students to use some form of audiovisual media while working alone.

In studying media utilization practices by teachers of science-related courses in U. S. community colleges, Oxford and Moore (1981) found that 40% of teachers of 1,275 courses fell into the "high media usage" category defined as "5% of the class-time." However, in 475 courses (37 percent) the teachers fell in the "low lecture/low media" course classification.

In the summer of 1980, Moldstad outlined a study of the media utilization practices of faculty of the I. U. School of Education, ranked third in the country according to the Chronicle of Higher Education. This proposed study grew out of a curiosity to learn how extensively such a faculty who seemingly had an exemplary infrastructure, staff support, and hardware and software resources actually used such learning resources.

These resources included: (1) access to one of the largest film and video tape libraries in the United States, (2) access to resources of the largest university-based audiovisual center with unusual support for faculty members in the area of instructional development, and (3) School of Education library, curriculum center, learning laboratory, television center, audiovisual subcenter, and Plato laboratory.

As it turned out, Felix Librero (1981), a doctoral student from the Philippines, became so interested in this proposed study that it was suggested he take it over as his doctoral dissertation under Dr. Moldstad's direction. Librero finished it just under a deadline he had to assume the directorship of the Department of Development Communications at the University of the Philippines at Los Baros in the summer of 1981.

## Statement of Purpose

The purpose of this study was to investigate audiovisual utilization practices and factors affecting media utilization by the faculty of the Indiana University School of Education during the Fall semester, 1980.

## Major Research Questions

The following questions guided the conduct of this investigation:

1. What are the audiovisual media most frequently used by the faculty of the School of Education in teaching graduate and undergraduate courses?

2. What is the extent of use of audiovisual media by the faculty?

3. How do the faculty members of the School of Education judge themselves in terms of their proficiency in using audiovisual media in their teaching practices?

4. What types of audiovisual materials do the faculty members forecast to be the ones in demand in the School of Education in the next five years?

5. What do the faculty see as the general purposes for using audiovisual media in higher education instruction?

6. How do the faculty members rate the significance of the contributions of audiovisual media in their courses?

7. To what extent do the faculty members produce audiovisual materials?

8. What are the production priorities of the faculty?

9. What are the deterrents to the use of audiovisual media from the point of view of the faculty?

10. How do the faculty rate the media services provided by the School of Education?

11. How do the faculty members rate classrooms in the School of Education in terms of their adequacy for the use of audiovisual media?

12. What improvements do the faculty members see as important to encourage use of audiovisual media in the School of Education?

## Research Methodology

A 27 item mail questionnaire was sent to all Bloomington School of Education faculty members who taught at least one three-credit-hour course the Fall Semester, 1980-81.

Ninety-four out of 129 faculty (72.9%) returned usable questionnaires, providing data from which the findings were made based upon descriptive statistical analyses.

## MAJOR CONCLUSIONS BASED ON FACULTY RESPONSES

Librero concluded that Indiana University Education faculty are extensive users of a wide variety of audio-visual media in both graduate and undergraduate courses based upon these data:

A. Faculty reported using a variety of 17 different media types an average of 31.1 times per 3 credit course--20.2 times per course excluding the chalkboard.

B. Utilization ranking of the 7 most used media were: chalkboard; overhead transparencies; charts, graphs and illustrations; 16mm film; audiotapes; videotapes; and 2x2 slides.

C. Faculty reported devoting 32.2% of undergraduate classtime and 23.9% of graduate class time to media related instruction.

D. Media most frequently reported for out-of-class use in undergraduate courses were audiotapes, 16mm films, and filmstrips: in graduate courses--16mm films, videotapes, and audiotapes.

E. Sixty-six percent of faculty judged contributions of audiovisual media either "extremely significant" or "moderately significant."

F. With the exception of computer-assisted instruction, faculty members judged themselves either "highly proficient" or "moderately proficient" in both operating and utilizing audiovisual media in teaching; many planned to expand their present use.

G. Audiovisual materials predicted in most demand in the next five years were overhead transparencies, videocassettes, CAI programs, 16mm films, and videodiscs.

H. Faculty members produce or have produced a wide variety of audiovisual materials with overhead transparencies and opaque graphic materials heading the list.

I. Three-fourths of the faculty expressed "interest" in further in-service training to extend their media production and utilization skills.

J. In general, the faculty indicated no major deterrents to the use of audiovisual media except for lack of time to select, locate, and preview commercially produced materials. Classroom improvements in areas of heat control and air conditioning and better control of extraneous light during projection were most frequently cited problems.

As a case study of utilization practices of the Indiana University School of Education, the results of this study cannot be generalized to other institutions. However, it is hoped the data generated might serve as part of the data base needed to better evaluate the usefulness of instructional technologies in higher education.

Further studies of faculty utilization patterns, faculty planning, and student reactions and achievement results must be undertaken to move us toward more accurate generalizations regarding audiovisual media utilization in higher education.

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# VISUALIZING RESEARCH

by
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The research paper or documented essay remains a staple in the American high school. Often mandated by school systems for all but the slowest students, this rather lengthy piece of work represents to students, at best, a difficult challenge to be surmounted; at worst, a dreaded rite of passage to be endured. To the teacher, the research paper represents a bridge between the high school and the more sophisticated modes of writing awaiting the students in the future. The ability to analyze, interpret, and organize a body of information remains an elusive but much sought-after skill, and these skills are an integral part of a research paper.

The program grew out of a desire to teach the process of research in a slightly different and perhaps more meaningful manner. The Howard County curriculum guide stipulates that students must write a paper of definition as well as a research paper. Further, it is suggested in the guides that critical thinking/problem solving techniques also be taught. In an attempt to combine these objectives, and make writing a research paper less tedious, we designed a unit in which we encouraged students to define a pressing social problem in visual terms and thereby develop student abilities to analyze, to criticize, and finally to synthesize.

Having said all that, one problem remains. Students rarely relish the prospect. Faced with the task of perfecting research skills for average suburban students living in a comfortable middle-class protected environment, motivating these students was the obvious crucial initial step. Most of the students had written papers in previous years, so that the fundamentals had to be briefly reviewed. The important concerns hinged on subject matter. What we hoped to do was to combine research skills with visual skills and somehow not only create an interesting visual presentation, but produce students who were motivated and interested with an increased awareness of the world surrounding them. Since most of the students were seniors, we were anxious to bridge the gap between a protected environment and a harsh reality. Also, we hoped to raise their awareness level in direct proportion to their perfected research skills. What we hoped for was an idealist's dream; what we achieved was acceptable to a pragmatist.

We decided to launch a semester's body of work divided into four major parts. In the first part, students would examine

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social critics of the past and would present an oral report to their fellow classmates. In the second part, students would identify and research a current social problem and write a documented essay on it. In the third part, students would engage in a variety of activities designed to increase visual literacy. Finally, students would present their research in some visual form, either sound-slide or video-tape.

The first step involved an examination of problems that have plagued society for centuries. With the aid of both the media and English teachers, the students identified people who had examined society and found it wanting. Specifically, the students focused on the method utilized by the social critic to dramatize the problem and the effect of that dramatization. Some attempt was made to interpret the total effect of the critic on society. After all the presentations had been made, the students were able to evaluate the range of problems that had somehow defied long-standing solutions despite the best efforts of people such as Jonathan Swift, Voltaire, Charles Dickens, Mark Twain, and John Steinbeck, among others.

At this point, students were ready to enter the second phase of the program. They selected a problem affecting contemporary society, cleared it with their English teacher and started approximately three weeks of solid research. They were instructed to identify a problem they wanted to solve, one that stirred their curiosity, and to engage in a coherent, purposeful investigation. It was at about this point that students were introduced to the possibility of turning this research into a visual statement with the clear objective of suggesting solutions. During this three-week period of research, students were instructed to watch as many documentaries as they could and to examine as many photographic essays as possible, always with the idea of isolating the elements of the visual message that made the documentaries or essays successful. So, in addition to the working bibliography, outlines, rough drafts, and footnotes, the students also examined problem-solving techniques and visual persuasion methods. Quite a task!

While students worked on their rough drafts, we asked them to accumulate at least five excellent pictures of some concern or social issue. To coincide with some of the research topics being explored, we asked for pictures that dealt with teen-age problems of suicide, pregnancy, runaways, and alcoholism, as well as the more general problems of war, nuclear disarmament, discrimination, and ageism. We wanted students to bring in pictures that depicted a different opinion or viewpoint on the subject. We hoped to show that a photographer can choose to emphasize that war is honorable, courageous, patriotic, inhumane, wasteful, or brutal. Furthermore, through art, the photographer can suggest humor, irony, or can make a symbolic comment (Eckhardt, 1977).

At the end of the three weeks of research, we spent two class days on rough draft critiques. Students were placed in groups of six to read, compliment, criticize, suggest, encourage, or otherwise react to each other's research and rough draft. They did use a rubric to help with the mechanical details. And, they used their enlarging awareness to help with comments on the content. The exposure to their fellow classmates' papers also served to enlarge awareness.

Using their classmates' comments and suggestions, students rewrote their papers at home, while we spent the time in class examining visual persuasion. We started with the more obvious examples of distorted perceptions--the vase and the ugly/beautiful woman. We made the point that our varied experiences direct our perceptions. Any individual may see something another person might overlook entirely. But, of course, we wanted the students to refine their perceptions and to expand their powers of observation.

During this week of examining the visual, we showed students cartoons of abstract figures and asked them to write ten sentences beginning with "I see...." The students were encouraged to read their sentences aloud, and then we examined how closely sentences resembled each other. We discussed what the differences told us about our perceptions and the connection between the visual and the written word (Constanzo, 1982). In debating the question of "what you see is what you get," we decided that in order to describe our perceptions we relied on comparative words such as closer, further, wider, longer, and so forth. But, the visual did all that without those words.

To make the point even clearer, we asked students to draw a picture of an ancient Aztec goddess using the following verbal description (Constanzo, 1982):

> She is nine feet tall carved in one massive block of granite, nearly rectangular, but three times taller. The face is formed by a meeting of two snake heads, their mouths joined as one gaping mouth. Around the neck is a necklace of human heads. She has many pendulant breasts and the body is covered with reptilian scales. The only article of clothing is a skirt of human hands.

What happened, of course, was that pictures were remarkably unique, and we were able to say, without any dissenters, that words leave gaps allowing the pictures to vary greatly.

Then we asked the students to write a short paragraph in which they described a spiral staircase, a rubber band, or a swan dive. Without identifying the object, a fellow student was chosen to attempt to draw the object on the chalkboard, using only the written description. The writer was not allowed to add any gestures or additional words. The results served to emphasize the point that words can be misinterpreted and, at times, inadequate.

We then turned our attention to how imagemakers reveal aspects of reality to us. By examining photographs of Lewis

Hines, Jacob Riis, Dorothea Lange, Margaret Bourke White, Leonard Freed, and Henri Cariter-Bresson, we were "able to appreciate the photographer as social commentator," to study the "decisive moment," and to pay special attention to the purposes of the visual image. Our major purpose here was to examine both visual persuasion and creative visualization (Williams, 1978).

At this point we turned our attention to the photographs that the students had gathered. We looked at each picture to determine the most important parts, the parts that carry the message. Equally important, we looked at subject, purpose, and emotional impact. Further, we discussed elements such as the use of color, subject, angle, focus, and special techniques. Particular attention was paid to technical effects such as silhouetting and the use of a soft focus to isolate "that moment of reality" mentioned in the Center for Humanities presentation.

At the beginning of the second week of the final phase, all students were exposed to a variety of interview techniques that would help carry them through some of the necessary interviews. Although many students used in-school personnel such as teachers, guidance counselors, nurses, and administrators, it was necessary for other groups to interview police, judges, social workers, and other people involved in fields associated with societal problems. Thus, it was necessary to discuss how to set-up and conduct interviews. Basically, the interview techniques stressed the importance of establishing reliability, focusing questions on the here and now, and providing the subject with the opportunity for revising.

Also, at the beginning of this week we discussed the importance of a script and the necessity of continuity and clarity. Using the structure previously identified in commercials, we explored the four-stage pattern: establishment, introduction of conflict, development of conflict, and conflict resolution. Further, we made the point that clarity was essential. Since information is sometimes heard only once, it must be understood the first time. Students were cautioned to use short, declarative sentences, active verbs, and to avoid cliches and mixed metaphors.

Mid-week the students separated to allow them to pursue their various tasks and to allow the scriptwriters to work on the rough shooting scenario. The purpose was to organize thoughts in a general way and to outline proposed content and sequence. Also listed in this rough shooting scenario was the time needed for the sequence and any special notes for which students would have to make provisions. After another brief meeting with all members of a group, the scriptwriters prepared a shooting script. This was to be a tightly planned script with camera angles fully described and time accounted for up to the seconds.

Finally, one other element that we chose to explore in this third part of the unit was the use of persuasion in commercials. We isolated the organization of the commercial and discovered that the majority either posed a problem or asked a question and then gave a solution. We suggested that this structure might prove extremely useful in presenting research visually.

Thus, with the examination of the visual message partially explored, the students were ready to begin the final phase of the unit--the conversion of research into a visual statement. Students formed groups of five or six. So, for a class of thirty-four students, we ended up with five groups. These groups then discussed all of the social problems they had previously researched. In addition to the problems mentioned earlier in this essay, students also explored the problems of child abuse, wildlife extinction, acid rain, anorexia, illiteracy, rising college costs, and women's rights. Some of the students formed their groups on the basis of commonality of research, while other groups formed on the basis of friendship. As expected in most group projects, some personality conflicts arose and students changed groups. The primary purpose of the group was to consider all of the social problems researched by members of the group and to choose one subject that was not only agreeable to all members of the group, but that could be successfully adapted to a visual medium.

During the first week of this final phase of the unit, the students not only selected their subject, they also had to decide on the treatment of the subject, construct an outline showing this treatment, create a storyboard and a project design, and present this project design to their fellow classmates. The project design had to include a description of all jobs necessary to complete the project as well as the students who would fill these jobs. It also included all sound, music, and/or sound effects to be used in the production.

Three weeks were allocated for shooting and editing the product. This allowed students to schedule interviews at convenient times and to edit their material with as little disruption of their other school work as possible. The students who were doing the interviews went into the community to interview police, judges, counselors, and anyone else who might help them explore specific social issues. One side effect of this procedure was the exposure the students received to a variety of careers and their favorable reaction to the professionals they met. To accomplish this and to make sure that their English work was up-to-date, while some of the students were out pursuing interviews, others were working through a thorough review of grammar principles.

Thus, five weeks were allocated to converting the ordinary research paper to a visual statement. Students were not taking a video or sound/slide production course, and we were not looking for technical perfection. We felt rather strongly that the process was as important, or perhaps more important, than the product. Some of the students had never held a camera before this unit, and few had any technical experience, so we could not expect technical perfection. As a matter of fact, one of the groups had audio problems because they had neglected to take ear phones with them on an important interview and were not even aware that they did not have sound.

At all points in the program it has been our objective to encourage students to expand their horizons. Unexpected bonuses were received as a result of this unit. In expanding their horizons, they discovered that the written word leaves gaps in communication, making the visual message exceedingly important. In assessing the importance of visual persuasion, these students crossed the bridge that separates the school from the community and emerged with a greater understanding of social problems and a greater respect for adults in the real world. They explored the courts and perceived the need for restraint. They visited the shock-trauma center and realized the need for research. They conversed with the aged and discovered the need for compassion. They walked the corridors of rehabilitation hospitals and understood the need for patience. Thus, in examining current social problems, they also examined themselves and grew up into the world they were about to enter as responsible high school graduates.

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# THE EFFECT OF VISUALIZATION AS AN AID IN TEACHING GRAMMATICAL CONCEPTS OF GERMAN

by

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Systematic research has indicated that the use of visual aids can improve student achievement (Levie & Dickie, 1973; Dwyer, 1972, 1978). In foreign language study it also has been found that the use of audiovisual materials does increase student performance (Roberts, 1954; Hueberner, 1959, 1960, Previtali, 1960). However, practically no one except Alexander (1954), Ziegler (1970) and Clausing (1975) has investigated the possibility of using visuals to teach German grammar. Reasons for this neglect are possibly the lack of interest in visualizing grammatical concepts, the feeling that not too much will be accomplished by it, and possibly, above all, the difficulty of visualizing certain grammatical concepts. Specifically, the focus of this investigative study was to determine the effectiveness of the use of black-and-white line drawings (slides) as an aid in the teaching of specific grammatical concepts in German.

## Methodology

### Content Selection

Prepositions which govern the dative/accusative case ("an," "auf," "in," "hinter," "neben," "uber," "unter," "vor," "zwischen") represent a problematic teaching/learning area in German grammar. The problem with this group of prepositions is its ambiguity for speakers of English, for there is no corresponding pattern that exists in English. English does have pronominal "case" forms (I/me, etc.), but there is only one object form of the English pronoun. With German dative/accusative prepositions, the student must choose between location and destination, depending upon the verb, before determining which object case (i.e., dative or accusative) to employ for the noun or pronoun. This grammatical concept is, therefore, confusing to the English-speaking student, who does not have to be concerned with this choice when using English equivalents. Recognizing that this grammatical concept presents a problem for the student learning German, and recognizing further that research has established the effectiveness of visualization in facilitating student learning, an effort was made to apply the techniques of visualization to the teaching of the dative/accusative prepositions.

Pilot Assessment

A pilot pretest (of the instructional content) measuring student proficiency in utilizing prepositions which govern the dative/accusative case was implemented. Each of the nine prepositions appeared in six different sentences. Students were asked to select the correct response by marking accusative (A) or dative (B). Twenty minutes were allowed for the test. Item analysis of the pretest performance identified those prepositions which presented the most difficulty to the students. Out of the 54 test items four prepositions--"an," "hinger," "in," and "vor"--were selected for visualization in the actual experiment. Based on these results an instructional unit focusing on the four prepositions was developed.

Material Preparation

Twenty-four of the slides displayed black-and-white line drawings (e.g., cartoon figures); each illustrated one point of grammar, i.e., the grammatical concept (case distinction) underlying the prepositions considered in this study. The other 24 had printed narration. There were four groups of slides (corresponding to each of the four prepositions) labeled 1, 2, 3, and 4 consecutively; each group contained 12 slides, labeled a, b, c, d, e, f, g, h, i, j, k, and l within each group, for a total of 48 slides. Two additional slides introduced the two cartoon figures that were to be depicted in the slides previously mentioned. There were no written scripts to accompany the slides; instead, narration was provided by the investigator, who read the information (in German) within each group:

1. Slides a, c, e, g, i, and k of each group contained illustrations with captions in question form underneath. The investigator asked the question depicted on each slide, then called on a student to analyze the situation illustrated. Not only was the student required to answer the question (in German), but also to say what case use was represented in the illustration.

2. Slides b, d, f, h, j, and l of each group presented the correct response to the questions posed in the preceding group of slides, that is, b corresponded to a, d to c, etc. Students were now able to see whether the question on the preceding slide was answered correctly; they could also see the correct response. In the answer presented, case was featured in bold letters by the definite article. The procedure consisted of a simple presentation of the slide, followed by a reading of the correct response by the investigator.

Differences in the slides existed as follows:

1. Following the questions on slides a, c, e, and g, a noun with its gender, employed in answering the question, was given in parentheses. The information in parentheses enabled the student to concentrate on the answer without additional stumbling blocks. Located in the upper left-hand corner of the slide in bold print was the cued preposition for that group. Students were required to use the target preposition cued along with the noun given in parentheses to answer the question. Illustrations and formats were identical in slides a and c, as were the illustrations and formats in slides e and g. Slides c and g served as reinforcement of the particular case represented in slides a and e respectively. Slides l and k featured different illustrations and questions that represented one case use. No other information was provided on these two slides.

2. Slides b, d, f, and h contained above the illustration a description in bold print of the case(s) governed by the preposition cued in the preceding slide and information on case use, which was provided in the lower right-hand corner. The formats of slides b and d were identical, as were the formats of slides f and h. Slides d and h served as reinforcement of the particular case use represented in slides b and f respectively. For these two slides (d and h), the correct responses were read by the instructor for emphasis. Slides j and l contained no information except the responses to their corresponding preceding slides.

## Experimental Procedure

Students receiving the visualized treatment (Group I) received six minutes of oral instruction on prepositions that govern the dative/accusative case, followed immediately by a 13-minute slide presentation on the same grammatical concept, but only focusing on four of the nine dative/accusative prepositions --"an," "hinter," "in," "vor"--the area of difficulty identified by the pretest. When presenting the odd-numbered slides, the investigator read the question and asked a student to respond to the question printed on the slides. Often, the investigator inquired of the student why the particular answer was selected. The odd-numbered slides held the same format (caption in question form), with the exception of the differences in questions, and cued prepositions and nouns with their genders. The even-numbered slides contained a response to the preceding slide and information on case distinction. The format was the same here, but the information varied for the most part. Information on these slides was read by the investigator and shown to the students for reinforcement. When presenting the slides, the investigator did not incorporate extrinsic factors; she did clarify questions raised by the students pertaining to the translation of a word or sentence depicted on a slide, and she explained possible contractions of these prepositions (i.e., "am," "ans," "im"). The information sought by the investigator from the slides answered the following question: Which case use is represented here? Since German dative/accusative prepositions are often a problem because case must be taken into consideration when discriminating their (dative/accusative prepositions) use in a sentence or clause, the slides were designed to illustrate case distinction. Total instructional time (oral presentation and slide presentation) was 19 minutes. Following the slide presentation, an immediate posttest was administered to 22 female students and 23 male students. The students had exactly 20 minutes to take the test.

Students in Group II, receiving conventional instruction, received 10 minutes of oral instruction on the same grammatical concept presented to Group I, with the exception that students in Group II: (1) were allowed to ask follow-up questions concerning the grammatical concept; (2) were shown examples of the two case uses on the blackboard; (3) were exposed to constant repetition of the grammar rules; (4) were not given a slide presentation on the grammatical concept, but rather received instruction on the grammatical concept, utilizing a conventional method; and (5) were given a 30-minute practice session on all nine of the dative-accusative prepositions, using the textbook employed for regular instruction on this level (*First Year German*, by Helbling, Gewehr, and von Schmidt, 1975). Practice exercises were found in Chapter Eight of the text on pages 144 ("Oral Practice," Sections A, B, and C--24 problems), and 152-153 ("Review Exercises," Sections A and B--20 problems). A student was asked to tell whether the answer was dative or accusative. During the practice session, the investigator pointed out to the students possible contractions with these prepositions. Total instructional time (oral presentation and practice session) was 40 minutes. Following the oral presentation and practice session, the same immediate posttest was given to Group I. Figure 1 illustrates the experimental procedure followed.

## Criterion Tests

### Immediate Posttest

Immediately after the instructional presentation, the immediate posttest was administered to all students enrolled in second-level elementary German classes. The purpose of the immediate posttest was to assess comprehension of the material presented. Of the 54 test items, 24 were related to the area of difficulty ("an," "hinter," "in," "vor") as dictated by results of the pilot pretest. The remaining 30 test items were designed to ascertain comprehension of the five remaining prepositions. Figure 2 presents the subdivisions of both the immediate and delayed test items.

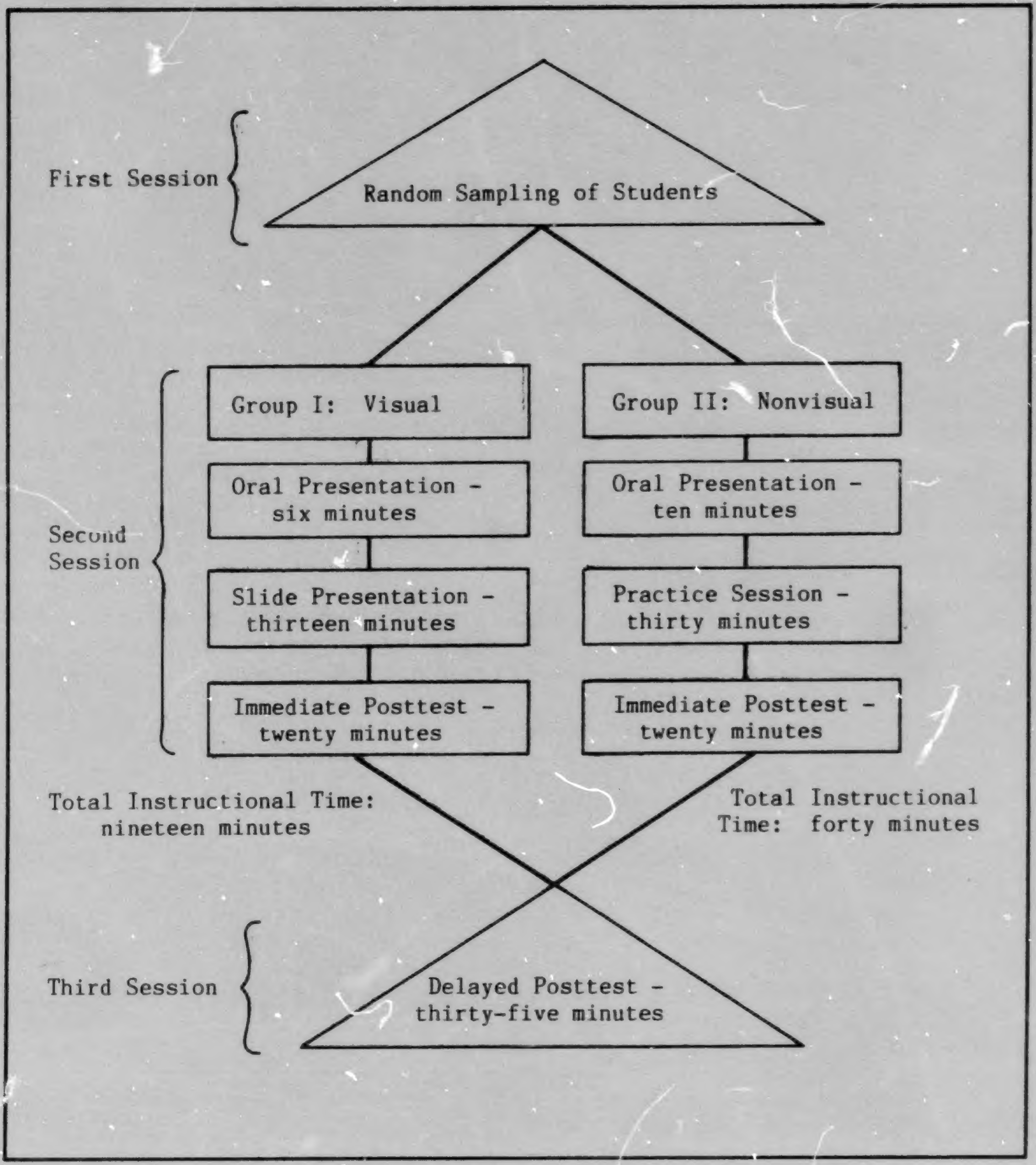
First Session
Random Sampling of Students
Group I: Visual
Group II: Nonvisual
Oral Presentation - six minutes
Oral Presentation - ten minutes
Second Session
Slide Presentation - thirteen minutes
Practice Session - thirty minutes
Immediate Posttest - twenty minutes
Immediate Posttest - twenty minutes
Total Instructional Time: nineteen minutes
Total Instructional Time: forty minutes
Third Session
Delayed Posttest - thirty-five minutes

Figure 1. Schematic outline of the experimental procedures.

| Identification of items | Immediate Posttest (Number of Items) | Delayed Posttest (Number of Items) |
|---|---|---|
| Related | 24 | 24 |
| Unrelated | 30 | 30 |
| New | -- | 36 |
| Total | 54 | 90 |

Figure 2. The subdivision of the immediate and delayed posttests.

A delayed posttest consisting of 90 items was administered to all students enrolled in second-level elementary German classes, two weeks after the posttest, to determine retention of the learned material. Fifty of the items were identical to those of the pretest and immediate posttest (included are those 24 items identified as the area of difficulty), while the other 36 items, developed to measure the intended achievement better, were composed of new sentences.

## Results

Three analyses of variance were conducted on scores achieved by students on the immediate posttest: the 24 items related to the area of difficulty (hereinafter referred to as the "related items"), the 30 items not related to the area of difficulty (hereinafter referred to as the "non-related items"), and the 54 items making up the total number of items (hereinafter referred to as the "immediate total"). The Kuder-Richardson Formula 20 was used to test reliability for all the above item groups.

Four analyses of variance were conducted on scores achieved by students on the delayed posttest: the related items, the non-related items, the 36 new items (hereinafter referred to as the "new items"), and the 90 items making up the total number of items (hereinafter referred to as the "delayed total"). The Kuder-Richardson Formula 20 was likewise utilized to test the reliability of the item groups.

The analysis of variance on the three immediate tests indicated a significant difference on the related items only. This difference favored the experimental group. There were no significant differences between the experimental and control treatment groups on the nonrelated items and the immediate total. Tables 1 through 4 present the meaningful results of the statistical procedures.

## Table 1

### Analysis of Variance on the Immediate Test: Related Items

| Variance | DF | Sum of Squares | Mean Square | F | p-value |
|---|---|---|---|---|---|
| Between | 1 | 28.84 | 28.842 | 4.304 | .05 |
| Within | 92 | 616.53 | 6.701 | | |
| Total | 93 | 645.37 | | | |

Significant at the .05 level

## Table 2

### The Means and Standard Deviations of the Experimental and Control Groups on the Three Immediate Tests

| Group | 24 Related Items | 30 Nonrelated Items | 54-Item Immediate Total |
|---|---|---|---|
| Experimental (N = 45) | Mean = 21.33<br>SD = 2.56 | Mean = 26.07<br>SD = 4.04 | Mean = 47.40<br>SD = 6.31 |
| Control (N = 49) | Mean = 20.22<br>SD = 2.62 | Mean = 25.65<br>SD = 3.81 | Mean = 45.88<br>SD = 6.06 |
| Grand Mean (N = 94) | 20.75 | 25.85 | 46.61 |

## Table 3

### The Kuder-Richardson 20 Reliability Coefficients for the Three Immediate Tests

| Scores | Number of Items | K-R 20 |
|---|---|---|
| Related Items | 24 | .68 |
| Nonrelated Items | 30 | .83 |
| Immediate Total | 54 | .87 |

Table 4

The Kuder-Richardson 20 Reliability Coefficients for the Four Delayed Tests

| Scores | Number of Items | K-R 20 |
|---|---|---|
| Related Items | 24 | .67 |
| Nonrelated Items | 30 | .76 |
| New Items | 36 | .72 |
| Delayed Total | 90 | .88 |

## Conclusions

The statistical analysis of the related items (24) on the immediate posttest indicated that the visual group performed significantly better than the nonvisual group. The following observations offer plausible explanations to this effect:

1. The visuals which were designed to portray (e.g., dramatize and emphasize) graphically those prepositions which were identified by a pretest as presenting the most difficulty for students functioned effectively in improving student achievement.

2. The visuals used to complement the prepositions did in fact serve to reflect those items which were tested.

Results of the analyses of the other six scores indicated that statistical significance was not met; several possible explanations for this can be considered:

1. Since students participating in the study were enrolled in a regular second-level elementary German course, they continued with regular class instruction after the instructional (experimental) sequence and were tested by means of a quiz and later a final exam on the same material presented during the experiment, along with new material. The grades from the quiz and final exam made up a part of the students' grades. Therefore, since the grammatical structure presented in the experimental procedure was normally taught at the beginning of second-level elementary German, it was necessary that the investigator keep in mind that the participants would receive further testing (after the experimental task).

   In addition to the above, students were informed at the beginning of the instructional sequence that everything done (i.e., immediate and delayed testing; classroom discussion) for the investigator would count toward their final grades for the course and were informed to pay strict attention to their investigator because the grammatical concept to be taught was to be learned in one class period only. With these facts in mind, the students probably felt they should be attentive and store the information learned. Whenever information is to be used at a later period, or whenever one is expected to use specific information again, retention is enhanced. However, if one feels the need not to learn information, for it will not be used again, one tends to forget the information and lose it.

2. More time was spent on teaching the grammatical concept in the nonvisual group (40 minutes) than in the visual group (19 minutes). Spending more time on the grammar in the non-visual group possibly made up for the advantage that visualization has; and if equal time would have been spent with both groups, it would seem that the visual group would have done better. In other words, it took more time--in fact, twice as much--to explain the grammar point in the conventional way than it did in the approach utilizing visualization; and after the instructional presentation, both groups tested approximately the same.

## Discussion

Students in Group I learned the entire grammatical concept in 19 minutes, while students in Group II learned the grammatical concept in 40 minutes. In addition, students in Group I were taught only four of the nine prepositions; and they had to apply the information given to them on the slides to the remaining five prepositions. On the other hand, students in Group II, who were taught all nine prepositions, were allowed sufficient amount of time to practice all the prepositions and were able to ask follow-up questions concerning the prepositions. Though most test scores of both groups seemed to be about the same, it is clear that visualization was effective in that the material to be learned was acquired in half the amount of time. Thus, use of visualization in the classroom to illustrate grammatical concepts would possibly allow more time in the class for other activities (i.e., culture, songs, etc.)

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# A SYSTEMATIC ASSESSMENT OF THE EFFECT OF VISUAL TESTING OF VISUALIZED INSTRUCTION: A JUSTIFICATION FOR INSTRUCTIONAL CONGRUENCY

by

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## Introduction

Efficient information acquisition and long-term retention and retrieval are important instructional variables if survival is a goal in an information rich society. One of the perennial problems associated with the teaching-learning process is the determination of how learners acquire, store, and recall information. As a result, a number of information acquisition strategies have been proposed which attempt to explain how learners acquire and retrieve information. For example, Tversky (1969, 1973) has found that verbal and visual information are encoded differently depending on the learner's perceived use of the information. Glanzer and Clark (1963) have advanced the notion of a single information processing system (verbal-loop hypothesis) which contends that visual information is translated into and stored in verbal/symbolic form. When the information is to be retrieved, it is retranslated from the symbolic form back to the original visualization. A number of specific research studies have been conducted which can be interpreted to be supportive of this orientation (Glanzer & Clark, 1963; Smith & Larson, 1970). The problem of how learners acquire, process, and retrieve information gains increased importance since current projections for the future call for increased use of a variety of new electronic visual mediating systems of instruction (interactive microcomputers, video disc systems, telecommunications, satellite, educational and cable TV, etc.) to be infused into both traditional and non-traditional instructional strategies. This increase in the use of the visual medium will be in addition to conventional multi-media systems (slide-audiotape, film, pictures, video-tape, overhead transparencies, visualized texts, etc.) already considered to be integral components of effective instructional strategies.

The importance of visualization in facilitating the teaching-learning process seems to stem from the fact that learners tend to have more structural stimuli to react to than that which is provided by its symbolic counterpart (Anderson, 1976). In this respect, Stromnes and Nyman (1974) and Peeck (1970) found that the use of visualization to complement instruction was extremely effective in facilitating delayed retention over extended time periods. One explanation of this phenomenon is that since visualization can be processed on several cognitive levels simultaneously, the interactive practice of the to-be-retained information within the visual facilitates its entrance into long-term memory.

This being the case, optimum validity in cognitive assessment of learner information acquisition apparently can only be obtained if there is a high degree of congruency between the number of common features in the presentation (encoding) mode and the retrieval (evaluation) mode of instruction, e.g., if visualization is an integral component in facilitating learner encoding of the information, then visualization should also be used in the test items (decoding phase) used to assess learner achievement. Tulving and Thomson (1973, p. 359) have stated that, "only that can be retrieved that has been stored, and that how it can be retrieved depends ultimately on how it was stored." Research by Winograd and Conn (1971), Thomson (1972), Kolers (1973), Tulving and Thomson (1973), Tulving (1976), Battig (1979) and Jacoby and Craik (1979) can be cited in support of this position.

## Problem Statement

Visualization is being used extensively in the teaching-learning process and can be effective in improving student achievement. However, visualization is not being used in the testing or evaluation stages of information retrieval. This situation can lead to a number of undesirable conditions: (a) invalid assessments of the level of student information acquisition thereby affecting subsequent instructional decisions, (b) when students' perceptions of the test scores (obtained from verbal tests) reflect gross discrepancies between what they actually know and what the test scores revealed, their motivation for subsequent sustained learning activities is reduced, and (c) the proposed educational outcomes (the efficient and effective implementation of optimum student achievement) which were necessary to justify the expenses in the design, development, and delivery of the varied and elaborate visualized instructional systems are not being realized.

The objective of this exploratory investigation was to evaluate the sensitivity of two criterion dependent variables (students' performance on a visual or nonvisual version of an achievement test), used in two similar experimental designs to assess the number of main effects and interactions between and among the independent mode of instruction (visual or nonvisual), order of drawing test (before or after verbal/visual achievement test), and mode of drawing test (verbal cued or free recall). Specific questions which provided the focus of this study follow:

(a) Which evaluation strategy (visual vs. verbal) would detect the larger number of main effects of the independent variables on both the immediate and the two-week delayed retention tests?

(b) Which evaluation strategy (visual vs. verbal) would detect the larger number of interactions between and among the independent variables on both the immediate and two-week delayed retention testing?

(c) What is the effect of verbal cued vs. free recall on students' achievement of different educational objectives?

(d) Are there some educational objectives for which verbal tests are most appropriate and some for which visual tests are most appropriate?

(e) Does order of testing have an effect on student achievement?

(f) Do interactions exist among mode of instruction, mode of testing, type of testing and order of testing?

## Materials and Procedures

The content material used in this study was a 2,000-word instructional unit describing the human heart, its parts, and the internal processes that occur during the systolic and diastolic phases (Dwyer, 1967). This content was selected because it permitted evaluation of several types of learning objectives. Students receiving the nonvisual mode of instruction interacted with the instructional unit in a self-paced booklet format which contained no illustrations. Students who interacted with the visualized mode of instruction received the same verbal content as did students who received the nonvisual mode; however, their self-instructional booklets were complemented by 37 visual illustrations. Figure 1 presents a sample frame from the nonvisual instructional booklet and the corresponding frame from the visualized instructional booklet.

## Criterion Measures

Each student in each treatment participated in one of the instructional presentations and took three separate, 20-item criterion tests. Scores on the three individual criterion tests were combined into a 60-item total criterion test score. Students were permitted to take as much time as they needed to complete the instructional unit and the criterion tests. The following description of the kinds of performances measured by the criterion tests illustrates the kinds of educational objectives assessed in this study.

### Drawing Test

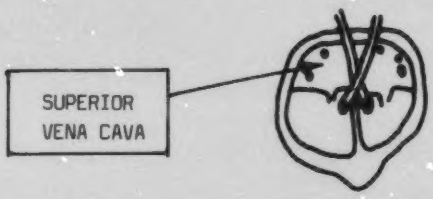
This test had as its objective the evaluation of the subject's ability to construct and/or reproduce items in their appropriate context. In this test, the emphasis was on the correct positioning of the verbal symbols with respect to one another and to their concrete references. The drawing tests used

NONVISUAL INSTRUCTION BOOKLET

SUPERIOR
VENA CAVA

As you would view a cross-sectional diagram of the heart, blood enters the right auricle through veins. Only veins carry blood to the heart. The superior vena cava is one of the two veins which deposits blood in the right auricle. There are no valves at the openings of these veins into the right auricle. The superior vena cava drains blood into the right auricle from all body parts above heart level; i.e., head and arms.

VISUALIZED INSTRUCTION BOOKLET



As you would view a cross-sectional diagram of the heart, blood enters the right auricle through veins. Only veins carry blood to the heart. The superior vena cava is one of the two veins which deposits blood in the right auricle. There are no valves at the openings of these veins into the right auricle. The superior vena cava drains blood into the right auricle from all body parts above heart level; i.e., head and arms.

Figure 1. Sample Frames from the Nonvisual Instruction Booklet and the Visualized Instruction Booklet.

in this study existed in two versions: the verbal format (Figure 2, Plate B) because it listed the parts of the heart to be positioned was called the Verbal Cued Version. The Free Recall Version (Figure 2, Plate A) contained the same directions as the Verbal Cued Version but did not contain a listing of the parts of the heart to be positioned.

## Identification Test

The objective of the identification test was to evaluate the students' ability to identify parts or positions of an object. This multiple-choice test required students to identify the numbered parts on a detailed drawing of the heart. Each part of the heart that had been discussed in the presentation was numbered on the drawing and appeared in a list on the answer sheet. The objective of this test was to measure the students' ability to use visual cues to discriminate one structure of the heart from another and to associate specific parts of the heart with their proper names.

## Terminology Test

This test consisted of 20 multiple-choice items designed to measure knowledge of specific facts, terms, and definitions. The objectives measured by this type of test are appropriate to all content areas that have as a prerequisite to the more complicated types of learning a comprehensive understanding of the basic elements (terminology, facts, and definitions) indigenous to the discipline.

## Comprehension Test

The comprehension test also consisted of 20 multiple-choice items. Students were given the location of certain parts of the heart at a particular moment of its functioning and asked to locate the position of other parts of the heart at the same point in time. This test required that students have a thorough understanding of the heart, its parts, its internal functioning, and the simultaneous processes occurring during the systolic and diastolic phases. The comprehension test was designed to measure a type of understanding that occurs when an individual understands what is being communicated and can use the information to explain some other phenomenon occurring simultaneously.

## Total Criterion Test

The items contained in the three criterion tests were combined into a 60-item total criterion test. The purpose of this test was to measure the students' understanding of all the content material presented in the instructional unit.

The format of each of the 60 multiple choice items in the identification, terminology, and comprehension tests was a verbal stem with verbal response options. The visual version of this

### Plate A. Drawing Test - Free Recall

Name ____________________ Date ______________

1. Draw a picture of a heart in the space below.
2. List the names of the various parts in the numbered spaces at the bottom of this sheet.
3. Place the numbers of the identified parts where they would be located on the heart.

1. ________________
2. ________________
3. ________________
4. ________________
5. ________________
6. ________________
7. ________________
8. ________________
9. ________________
10. ________________
11. ________________
12. ________________
13. ________________
14. ________________
15. ________________
16. ________________
17. ________________
18. ________________

### Plate B. Drawing Test - Cued Recall

Name ____________________ Date ______________

Draw a picture of a heart and place the number of the identified parts where they would be located on the heart.

1. superior vena cava
2. aorta
3. tricuspid valve
4. pulmonary vein
5. septum
6. epicardium
7. aortic valve
8. pulmonary valve
9. inferior vena cava
10. pulmonary artery
11. myocardium
12. endocardium
13. mitral valve
14. right auricle
15. right ventricle
16. left auricle
17. left ventricle
18. apex

Figure 2. Free Recall and Cued Recall Versions of the Drawing Test.

test was constructed so that for each of the 60 verbal items there was a matching visual item. For each of the response options on each of the 60 multiple-choice items an "equivalent" visual distractor was constructed. The stems of both the verbal and visual test questions were verbal and asked the same question; however, the stems of some of the visual test items were modified slightly to make them appropriate to the visual distractors. Figure 3 presents a sample of the verbal and visual formats for an item on the comprehension test.

## Design and Analysis

One hundred fifty-one undergraduate students enrolled at The Pennsylvania State University were randomly assigned to one of 16 treatment cells of the 2x2x2x2 posttest only experimental design. Figure 4, Plate A shows this design and number of students in each cell. The four independent variables were (a) mode of instruction: visual and nonvisual (See Figure 1), (b) mode of Achievement Tests: visual and nonvisual (See Figure 3), (c) mode of Drawing Test: free recall and verbal cued recall (See Figure 2), and (d) order of Drawing Test: administered before or after completion of the three individual criterion measures. The dependent variables were (a) students' performance on the visual and nonvisual versions of the individual criterion tests--terminology, identification, and comprehension, (b) performance on the Total Criterion Test, and (c) on the Drawing Test. Students received the individual criterion tests immediately after receiving their respective instructional units and then again two weeks later to obtain a measure of delayed retention. ANOVA statistical designs were conducted on each criterion measure. Where significant F ratios (.05) were found, differences between pairs of means were analyzed via Tukey's W-Procedure. Figure 4, Plate B illustrates the design followed in investigating the effectiveness of the verbal and visual evaluation strategies.

## Results of the 2x2x2x2 Analyses

Table 1 presents the means, standard deviations, and reliability coefficients for students receiving the verbal and visual test formats for each criterion measure on the immediate and delayed retention.

In comparing student performance on the main effect of instruction, students who received the visualized instruction achieved significantly higher scores on all criterion measures (verbal format only) than did students whose instruction did not contain visualization on both immediate and delayed retention respectively: Identification, $F(1, 135) = 12.33$, $p < .01$; $F(1, 135) = 7.15$, $p < .01$, Terminology, $F(1, 135) = 6.22$, $p < .02$; $F(1, 135) = 5.47$, $p < .05$, Comprehension, $F(1, 135) = 6.94$, $p < .01$; $F(1, 135) = 3.97$, $p < .05$, and Total Criterion, $F(1, 135) = 7.13$, $p < .01$. These results strongly support the use of properly integrated visualization in the teaching-learning process. In comparing the performance of students who received the visual and verbal test formats, insignificant differences

VERBAL TEST ITEM

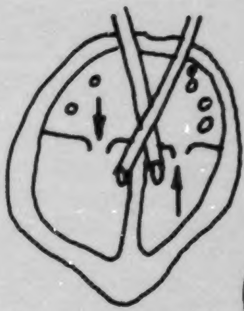
When blood is being forced out the right ventricle, in what position is the tricuspid valve?

A. partially opened
B. partially closed
C. open
D. closed

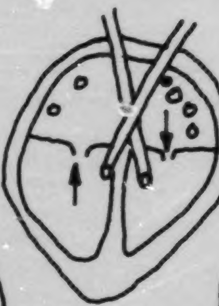
VISUAL TEST ITEM

The position of the tricuspid valve when blood is forced out of the right ventricle:

A



B



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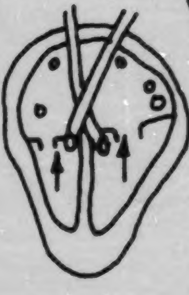

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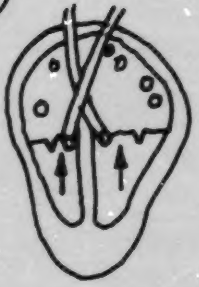

Figure 3. Verbal and Visual Forms of the Same Question on the Comprehension Criterion Test.

Plate A. 2x2x2x2 Analyses

| | | MODE OF ACHIEVEMENT TEST | | | |
|---|---|---|---|---|---|
| | | VISUAL | | NONVISUAL | |
| MODE OF DRAWING TEST | MODE OF INSTRUCTION | BEFORE | AFTER | BEFORE | AFTER |
| VERBAL CUED RECALL | VISUAL | N=10 | N=9 | N=10 | N=9 |
| | NONVISUAL | N=10 | N=9 | N=9 | N=9 |
| FREE RECALL | VISUAL | N=10 | N=10 | N=10 | N=10 |
| | NONVISUAL | N=8 | N=10 | N=9 | N=9 |

ORDER OF DRAWING TEST

Plate B. Experimental design with distribution of subjects for each of the two evaluation strategies (2x2x2 Analyses).

Visual Test Mode (N=76)

| | | ORDER OF DRAWING TEST | |
|---|---|---|---|
| MODE OF DRAWING TEST | MODE OF INSTRUCTION | BEFORE | AFTER |
| VERBAL CUED RECALL | VISUAL | N=10 | N=9 |
| | NONVISUAL | N=10 | N=9 |
| FREE RECALL | VISUAL | N=10 | N=10 |
| | NONVISUAL | N=8 | N=10 |

Nonvisual Test Mode (N=75)

| | | ORDER OF DRAWING TEST | |
|---|---|---|---|
| MODE OF DRAWING TEST | MODE OF INSTRUCTION | BEFORE | AFTER |
| VERBAL CUED RECALL | VISUAL | N=10 | N=9 |
| | NONVISUAL | N=9 | N=9 |
| FREE RECALL | VISUAL | N=10 | N=10 |
| | NONVISUAL | N=9 | N=9 |

Figure 4. Experimental Design with Distribution of Subjects by Cell.

TABLE 1. Means, Standard Deviations, and Reliability Coefficients Obtained from the Nonvisual and Visual Test Formats on Each Criterion Measure for Immediate and Delayed Retention.

| Variable | Identification Test | | Terminology Test | | Comprehension Test | | Total Criterion Test | | Drawing Test |
|---|---|---|---|---|---|---|---|---|---|
| | Immediate | Delayed | Immediate | Delayed | Immediate | Delayed | Immediate | Delayed | Cued Recall |
| **Verbal (Nonvisual) Tests** | | | | | | | | | |
| No. of Test Items | 20 | 20 | 20 | 20 | 20 | 20 | 60 | 60 | 18 |
| Mean Score | 13.93 | 12.63 | 13.37 | 11.36 | 11.48 | 10.23 | 38.80 | 34.21 | 10.63 |
| SD | 4.52 | 4.49 | 4.31 | 4.42 | 3.69 | 3.73 | 11.28 | 11.13 | 4.64 |
| Kuder-Richardson Formula 20 Reliability Coefficient | .86 | .83 | .82 | .81 | .72 | .74 | .92 | .91 | .89 |
| **Visual Tests** | | | | | | | | | Free Recall |
| No. of Test Items | 20 | 20 | 20 | 20 | 20 | 20 | 60 | 60 | 18 |
| Mean Score | 13.46 | 12.20 | 11.98 | 11.04 | 9.87 | 9.80 | 35.32 | 33.04 | 8.72 |
| SD | 4.21 | 4.46 | 3.67 | 3.70 | 3.99 | 3.99 | 10.66 | 10.73 | 5.13 |
| Kuder-Richardson Formula 20 Reliability Coefficient | .82 | .82 | .74 | .74 | .76 | .66 | .91 | .90 | .92 |

were found to exist for the Identification Test; however, on the Terminology, $F(1, 135) = 4.79$, $p < .05$, Comprehension, $F(1, 135) = 6.41$, $p < .01$, and Total Criterion Tests, $F(1, 135) = 3.91$, $p < .05$, significant differences were found to exist in mean achievement scores in favor of students who received the verbal versions of the criterion tests.

In investigating the effect of when students received the Drawing Test, before or after completing the three individual criterion tests, the results indicated that students who received the Drawing Test after completing the individual criterion tests achieved significantly higher mean scores ($F(1, 135) = 5.60$, $p < .05$). Also on the Drawing Test students who received the Verbal Cued version achieved significantly higher scores than did students who received the Free Recall version, $F(1, 135) = 7.87$, $p < .01$.

Significant interactions were found to exist: (a) among mode of instruction, mode of achievement and order of drawing test on the Identification Test, $F(1, 135) = 5.32$, $p < .05$ (Figure 5, Plate 1), (b) between mode of instruction and mode of drawing test on the Terminology Test, $F(1, 135) = 4.22$, $p < .05$ (Figure 5, Plate 2), (c) among mode of instruction, mode of achievement test and order of drawing test on the Drawing Test, $F(1, 135) = 4.05$, $p < .05$, (Figure 5, Plate 3), and (d) among mode of instruction, mode of achievement test and order of drawing test on the Delayed Total Criterion Test, $F(1, 135) = 7.19$, $p < .01$, (Figure 5, Plate 4).

## Results of the 2x2x2 Analyses

Figure 4, Plate B illustrates the design and number of students in each cell. The three independent variables were (a) mode of instruction (visual or nonvisual), (b) order of Drawing Test, administered before or after completion of the three individual criterion tests, and (c) mode of Drawing Test: free recall and verbal cued recall. The dependent variables were students' performance on the visual version of the achievement test for one design, and students' performance on the nonvisual version of the achievement test for the other. The dependent variables for both forms of the achievement tests were performance on each individual criterion test. Table 2 depicts the main effects obtained on each criterion test for both the immediate and delayed testing on the visual (Plate 1) and nonvisual (Plate 2) versions of the achievement tests. Where significant differences in student achievement occurred the critical areas were found to be: (a) mode of instruction favoring visualized instruction, (b) order of drawing test favored testing after receiving the individual criterion tests, and (c) mode of testing favoring the verbal cued format.

The 2x2x2 analysis of variance design conducted on the independent variables indicated that one interaction occurred on the nonvisual immediate achievement tests (drawing, ($F(1,67) = 6.31$, $p < .01$)), and four interactions occurred on the visual

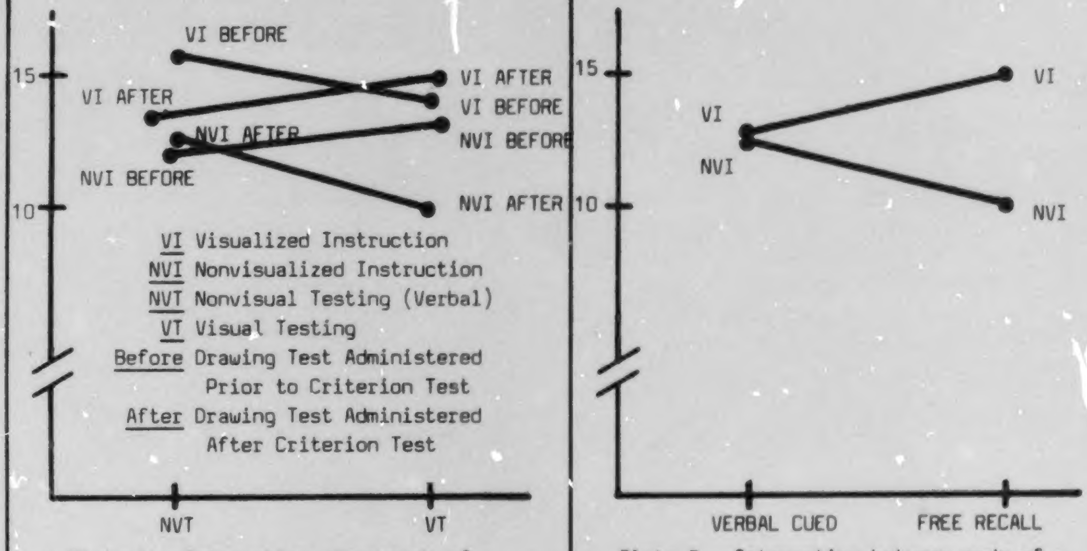

Plate 1. Interaction among mode of instruction, achievement test and order of Drawing Test on the Identification Test.

Plate 2. Interaction between mode of instruction and mode of Drawing Test on the Terminology Test.

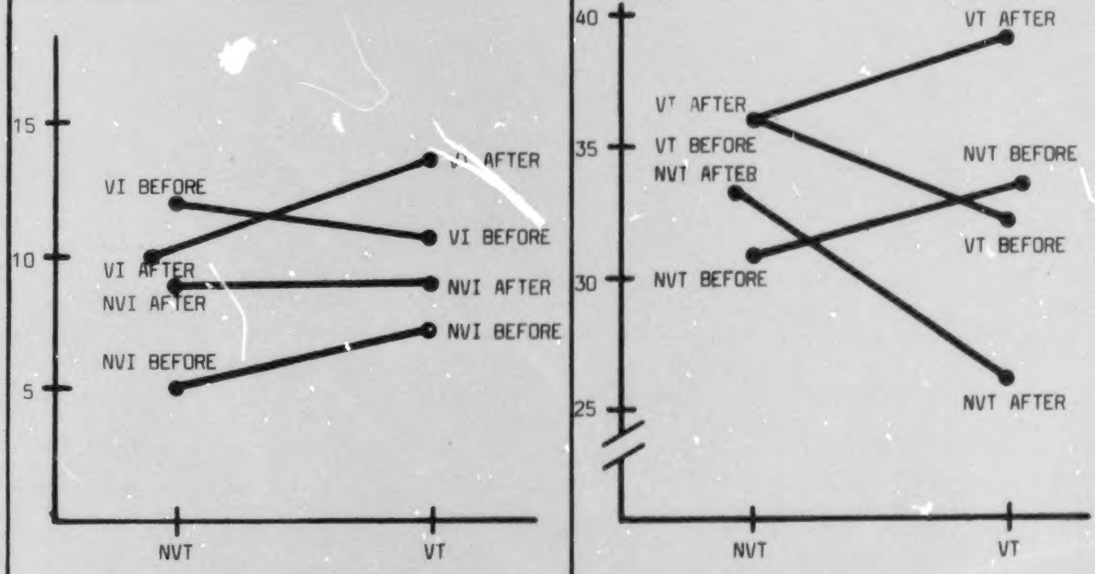

Plate 3. Interaction among mode of instruction, achievement test and order of Drawing Test on the Drawing Test.

Plate 4. Interaction among mode of instruction, achievement test and order of Drawing Test on the Total Criterion Test (Delayed Retention).

Figure 5. Interactions on the Immediate and Delayed Testing.

TABLE 2. Means Representative of Main Effects on Each Criterion Measure
(Immediate and Delayed Retention)

Plate 1. Performance on Visual Test

| Criterion Measure | Effect | Conditions | | Results | F | P. |
|---|---|---|---|---|---|---|
| | | Visual | Nonvisual | | | |
| Drawing | Instruction | 12.7<br>(N=39) | 8.0<br>(N=37) | Mode of Instruction Favoring Visualized Instruction | 16.54 | .001 |
| | | Before | After | | | |
| | Order of Drawing Test | 9.0<br>(N=38) | 11.2<br>(N=38) | Order of Drawing Test Favoring Testing After Achievement Tests | 5.42 | .05 |
| | | Verbal Cued | Free Recall | | | |
| | Mode of Drawing Test | 11.0<br>(N=38) | 9.2<br>(N=38) | Mode of Drawing Test Favoring Verbal Cued | 3.89 | .05 |
| | | Visual | Nonvisual | | | |
| Identification (Immediate) | Instruction | 14.6<br>(N=39) | 12.2<br>(N=37) | Mode of Instruction Favoring Visualized Instruction | 7.19 | .01 |
| Identification (Delayed) | Instruction | 13.3<br>(N=39) | 11.1<br>(N=37) | Mode of Instruction Favoring Visualized Instruction | 4.41 | .05 |
| Terminology (Immediate) | Instruction | 12.9<br>(N=39) | 11.1<br>(N=37) | Mode of Instruction Favoring Visualized Instruction | 5.26 | .05 |
| Terminology (Delayed) | Instruction | 11.9<br>(N=39) | 10.2<br>(N=37) | Mode of Instruction Favoring Visualized Instruction | 4.76 | .05 |
| Comprehension (Immediate) | Instruction | 10.9<br>(N=39) | 8.7<br>(N=37) | Mode of Instruction Favoring Visualized Instruction | 5.98 | .05 |
| Total Criterion (Immediate | Instruction | 38.4<br>(N=39) | 32.0<br>(N=37) | Mode of Instruction Favoring Visualized Instruction | 7.75 | .01 |
| Total Criterion (Delayed | Instruction | 35.5<br>(N=39) | 30.5<br>(N=37) | Mode of Instruction Favoring Visualized Instruction | 4.73 | .05 |

TABLE 2. Means Representative of Main Effects on Each Criterion Measure (cont'd.)
(Immediate and Delayed Retention)

Plate 2. Performance on the Nonvisual Test

| Criterion Measure | Effect | Conditions | | Results | F | p.< |
|---|---|---|---|---|---|---|
| | | Visual | Nonvisual | | | |
| Drawing | Instruction | 11.2<br>(N=39) | 7.1<br>(N=36) | Mode of Instruction Favoring Visualized Instruction | 17.32 | .001 |
| | | Verbal Cued | Free Recall | | | |
| | Mode of Drawing Test | 10.2<br>(N=37) | 8.3<br>(N=38) | Mode of Drawing Test Favoring Verbal Cued | 3.96 | .05 |
| | | Visual | Nonvisual | | | |
| Identification (immediate) | Instruction | 15.1<br>(N=39) | 12.7<br>(N=36) | Mode of Instruction Favoring Visualized Instruction | 5.43 | .05 |

achievement tests (identification, ($F(1,68) = 5.18$, $p < .05$)), terminology ($F(1,68) = 5.60$, $p < .05$)), comprehension ($F(1,68) = 8.56$, $p < .01$)), total criterion ($F(1,68) = 7.83$, $p < .01$)). All interactions occurred between mode of instruction (visual or nonvisual) and order of drawing test (administered before or after students completed the individual criterion tests) (Table 3). Follow-up analyses indicated that on the visual achievement tests (delayed retention) students who received the visualized instruction and completed the drawing test after completing the individual criterion tests achieved significantly higher mean scores. On immediate retention the interaction between mode of instruction and order of drawing test indicated that students who received the visualized instruction and completed the drawing test before completing the individual criterion tests achieved significantly higher mean scores. Figure 6 illustrates the obtained interaction on the different criterion measures.

## Summary: Comparative Analyses

Tables 4 and 5 present a summary of the findings of this investigation. These analyses indicate that the visual test (evaluation) strategy is more sensitive than the nonvisual test strategy in assessing the instructional effects of visualized instruction for both the immediate and delayed posttests. Additionally, the visual tests were sufficiently sensitive to detect interaction on the two-week delayed posttest. The instructional sequence visual instruction, visual test and interaction with the Drawing Test implied that immediate recall exercises, after instruction and testing, results in significantly larger amounts of visual information as demonstrated by performance on the two-week delayed visual test.

The two-week delayed posttests served as evaluative criteria to assess the effectiveness of the best combination of instruction, mode of testing, and order of testing as a means of enhancing the retention of learners. The nonvisual test failed to detect any interactions among the independent variables; however, the visual testing strategy detected the interactions among the independent variables and pointed out the most desirable sequence (VI VT DT, immediate retention). This data would lead us to assume that either the Free or Cued Recall Drawing Test significantly increased the retention of visual information. This phenomenon would never have been detected if the content acquisition resulting from the visualized instruction had been measured using only a nonvisual test strategy.

## Conclusions and Discussion

Based on the results of this study the following conclusions may be derived:

The use of visuals (simple line drawings) to complement verbal instruction facilitates the recall and subsequent reproduction (drawing) of the visuals presented in the instruction.

TABLE 3. Interactions Obtained on the Different Criterion Tests

Plate 1. Performance on the Visual Achievement Tests (Delayed Testing)

| Criterion Variable | Interactions | F-ratio | p.< | t-statistic | p.< |
|---|---|---|---|---|---|
| Identification | Mode of Instruction X Order of Drawing Test | 5.18 | .05 | 3.14 | .05 |
| Terminology | Mode of Instruction X Order of Drawing Test | 5.60 | .05 | 3.24 | .05 |
| Comprehension | Mode of Instruction X Order of Drawing Test | 8.56 | .01 | 3.16 | .05 |
| Total Criterion | Mode of Instruction X Order of Drawing Test | 7.83 | .01 | 3.57 | .05 |

Plate 2. Performance on the Nonvisual Achievement Tests (Immediate Testing)

| Criterion Variable | Interactions | F-ratio | p.< | t-statistic | p.< |
|---|---|---|---|---|---|
| Drawing | Mode of Instruction X Order of Drawing Test | 6.31 | .01 | 4.74 | .05 |

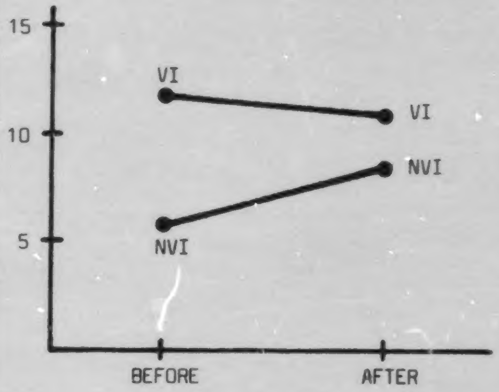

Plate 1. Interaction between mode of instruction and order of Drawing Test on the Drawing Test (immediate retention).

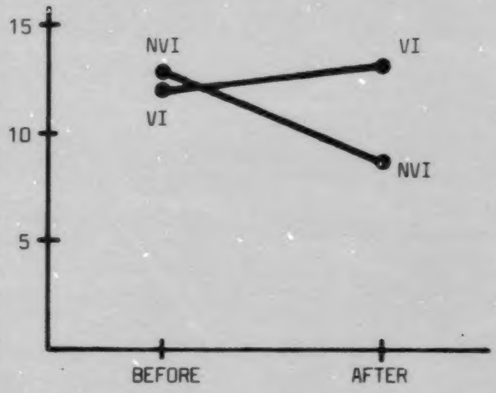

Plate 2. Interaction between mode of instruction and order of Drawing Test on the Identification Test (delayed retention).

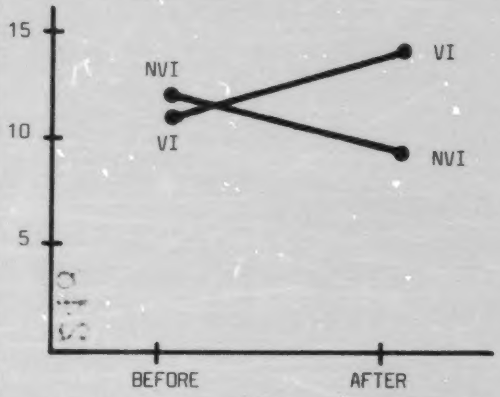

Plate 3. Interaction between mode of instruction and order of Drawing Test on the Terminology Test (delayed retention).

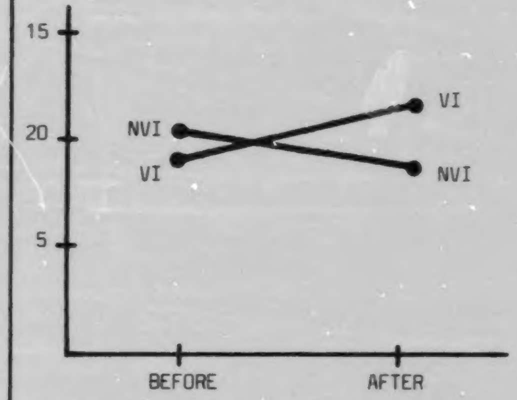

Plate 4. Interaction between mode of instruction and order of Drawing Test on the Comprehension Test (delayed retention).

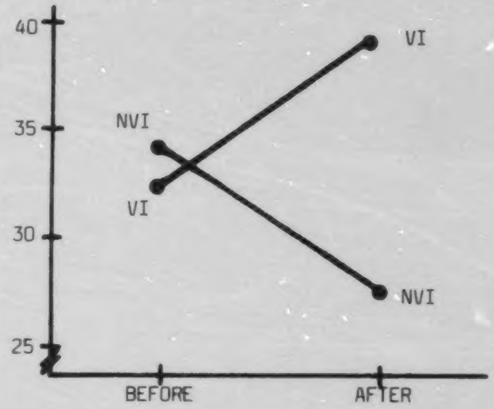

Plate 5. Interaction between mode of instruction and order of Drawing Test on the Total Criterion Test (delayed ret.)

Figure 6. Interactions on the Immediate and Delayed Testing (Visual and Nonvisual).

TABLE 4. Comparative Assessment of Main Effects Obtained from Three Statistical Evaluations Used to Analyze Student Achievement of Different Cognitive Objectives on Visual and Non-Visual Tests.

MAIN EFFECTS

| VARIABLE | STATISTICAL DESIGN 1<br>2x2x2x2 | STATISTICAL DESIGN 2<br>2x2x2 NV TEST | STATISTICAL DESIGN 3<br>2x2x2 V TEST |
|---|---|---|---|
| Identification | VI > NVI (I, D) | VI > NVI (I) | VI > NVI (I, D) |
| Terminology | VI > NVI (I, D)<br>NV TEST > V TEST (I) | | VI > NVI (I, D) |
| Comprehension | VI > NVI (I, D)<br>NV TEST > V TEST (I) | | VI > NVI (I, D) |
| Total Test | VI > NVI (I, D)<br>NV TEST > V TEST (I) | | VI > NVI (I, D) |

VI = Visualized Instruction

NVI = Non-Visualized Instruction

NV TEST = Non-Visual (Verbal) Test

I = Immediate Retention

D = Delayed Retention

V TEST = Visual Test

TABLE 5. Comparative Assessment of Interactions Obtained from Three Statistical Evaluations Used to Analyze Student Achievement of Different Cognitive Objectives on Visual and Non-Visual Tests.

INTERACTIONS

| CRITERION VARIABLE | STATISTICAL DESIGN 1 2x2x2x2 | STATISTICAL DESIGN 2 2x2x2 NVT | STATISTICAL DESIGN 3 2x2x2 VT |
|---|---|---|---|
| Identification | In x A x O (I) | | In x O (D) |
| Terminology | In x M (I) | | In x O (D) |
| Total Test | In x A x O (D) | | In x O (D) |

NVT = Non-Visualized Test
VT = Visualized Test
In = Instruction
A = Achievement

O = Order of Testing
M = Mode of Drawing Test
I = Immediate Retention
D = Delayed Retention

Students who received the nonvisual test format (verbal) achieved significantly higher mean test scores on the Terminology, Comprehension, and Total Criterion Tests than did students who received the visualized version of the same tests. However, these effects disappeared on the two-week delayed retention tests.

The order of Drawing Test (before or after taking the three individual criterion tests) had no significant effect on students' performance on the individual achievement tests. However, students who received the Drawing Test after interacting with the individual achievement tests performed better on the Drawing Test than did students who received the Drawing Test prior to receiving the individual achievement tests.

The use of visuals (simple line drawings) to complement verbal instruction is an effective instructional strategy for facilitating student information acquisition of the type measured by the Identification, Terminology and Comprehension Tests--for both immediate and delayed retention.

The mode of Drawing Test (verbal cued or free recall) had no significant effect on students' performance on the achievement test.

Students who completed the verbal cued version of the Drawing Test performed better on the Drawing Test than did students who received the free recall version of the Drawing Test.

Students who received the visualized instruction and interacted with the free recall version of the Drawing Test achieved significantly higher mean scores on the Terminology Test than did students who received the verbal instruction alone and received the free recall version of the Drawing Test.

Visual testing is significantly more effective than nonvisual testing in detecting main effects resulting from visualized instruction. For students receiving the visualized instruction, visual testing was found to be a highly sensitive evaluation strategy for assessing students' level of information acquisition of the type measured by the Identification, Terminology, Total Criterion (immediate and delayed retention) and the Comprehension Test (immediate retention). On the nonvisual test only one main effect (Identification, immediate retention) was detected.

On the Drawing Criterion both the visual and nonvisual evaluation strategies detected significant main effects for mode of instruction and mode of Drawing Test; however, the visual testing mode also detected a significant main effect for order of Drawing Test.

Only one interaction was detected on the immediate testing (Drawing Test) for the nonvisual testing strategy. No interactions were detected for the delayed retention.

On the immediate testing no interactions were obtained via the visual testing format; however, on the delayed retention data obtained two weeks later significant interactions were obtained on the Identification, Terminology, Comprehension, and Total Criterion Tests.

An interaction was obtained among mode of instruction, mode of achievement and order of Drawing Test (visualized instruction, nonvisual test format, and Drawing Test administered before receiving the individual criterion tests) on the Identification Test.

An interaction was found to exist among mode of instruction, mode of achievement test and order of Drawing Test (visualized instruction, visual tests and drawing test received after completion of the individual criterion tests) for both the Total Criterion Test (delayed retention) and for the Drawing Test.

The findings of this study indicate that the visualized version of the instructional unit significantly improved students information acquisition of the type measured by the criterion measures employed in this study--on both the immediate and delayed retention tests administered two weeks later. The visual testing mode was found to be more effective on the Comprehension and Total Criterion Tests (immediate retention) and on the Identification tests (delayed retention). This finding would tend to support the contention that although information acquisition may be facilitated by means of visualization it is converted from the visual to the verbal for storage and retrieval purposes. It is also possible that the visual approach to testing employed in this study was novel and since the students were unfamiliar with this type of testing they performed poorly. Interactions among mode of instruction and order of testing indicate that students' performance is influenced not only by how content is presented and evaluated, but also by the order in which specific cognitive learning levels are evaluated.

The data obtained in this study clearly demonstrate the superiority of visual tests, when compared to nonvisual tests (of the type employed in this study), as a means of assessing the instructional effect of visualized instruction and their value as criteria for detecting main effects and interactions among instructional variables defined in terms of visual and nonvisual characteristics. It is also interesting to note that a very significant characteristic of value testing was revealed in this study--its sensitivity in assessing delayed retention of visualized instruction in different cognitive levels (criterion test levels) and interactions among visual instructional variables that were not revealed on the immediate visual testing situation and were not detected in any way by the nonvisual test. These results would tend to question the appropriateness (Burr, 1963; Fargo, et al., 1967; Hopkins, et al., 1967; Stoker, et al., 1968) of previous experimental studies that attempted to empirically investigate the effectiveness of visual tests and resulted in nonsignificant statistical differences or significant statistical differences favoring nonvisual tests. In questioning previous results, the findings tend to confirm the contention that information retrieval is a very specific process, easily disrupted--and since features of the original learning cues are processed during a test, any reduction in the individual distinctiveness of the cues themselves would produce concomitant reductions in recall (Tulving,1967; Jacoby & Craik, 1979; Battig, 1979).

The findings of this exploratory study are significant considering that (a) for most students it was their first opportunity to respond on visual tests--a rehearsal session where students would become acquainted with the type of test format they were to receive might have significantly improved their performance on the visual tests, and (b) the fact that the visual distractors for the visual test items were intentionally designed to be congruent with their verbal counterparts may have imposed a severe limitation on the true potential of the visual tests--if the visual tests were not hampered by this restriction, the investigators might have been able to design visual distractors which would have assessed more validly the students' level of information retention.

The fact that the visual testing strategy was significantly more effective in detecting main effects (immediate and delayed retention) and interactions than was the verbal testing strategy indicates that in addition to more validly assessing student information acquisition, visual testing was instrumental in identifying some procedural considerations (interactions, e.g. mode of instruction X order of Drawing Test) in the teaching-learning process which may be capitalized upon to even further optimize the effect of visualized instruction and visual testing.

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# ENHANCING HUMAN POTENTIAL THROUGH EDUCATION

Describing visual literacy as "the mediating step" in the movement from non-reader to reader, Sewell takes us to the highly visual world of the Middle Ages to begin our section on education. After viewing his woodcuts from the Protestant Reformation, we change quickly to the British primary schools where, as Williams reports, teachers are experiencing many of the concerns of American educators that emphasis on "basics" may destroy such progress as has been made in the realm of enrichment activities. Nixon's description of a specific partnership between business and education to provide greater opportunities for development of visual literacy programs provides needed reassurance.

The role of teachers in mediated instruction is reviewed by Muffoletto. Fredette follows with a discussion of a required course for pre-service classroom teachers emphasizing basic skills of visual thinking. She points out that visual education is not the sole responsibility of art teachers. This is evidenced by the work of Sinatra, who describes two visual/spatial techniques for aiding students in organizing written discourse; Martinello's paper on the use of visual thinking in a history course for gifted and talented students; and the Wittes' visualization exercises in a seminar for upper level management.

Additional uses of visual literacy in the reading/language arts curriculum are advocated by Colwell, Mangano, and Hortin in their paper recommending student-generated humorous media to increase learning. From his university-level visual literacy course Sutton includes vivid illustrations of student progress in learning to draw. Deming delves into the rules governing the visual presentation of televised news programs. Critical viewing skills are also developed in an eighth grade television unit described by Robinson, who concludes with an extensive list of resources available for the classroom teacher.

# A VISUAL RHETORIC OF THE PROTESTANT REFORMATION: THE USE OF CARTOONS TO SPREAD LITERACY

by

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In so brief a paper it is impossible to give adequate coverage to a very broad topic or to the sources which are available. At the end of the paper I have included in my references a number of books which are not specifically cited in the body, but which are of great value in this area of research. Especially important are the volumes of woodcuts from the years 1500 to 1600 which have been edited by W. L. Strauss (Geisberg, 1974; Strauss, 1975). The earlier volume is a revision of the work done by Max Geisberg in the 1920's.

The world of the Middle Ages was a highly visual world filled with the stained glass windows of the cathedral and the woodcarving of the altar. It was a world in which few people read books, and even those books were not in the language spoken in the streets of France, Germany, or England. The stories of creation, the fall of mankind, the virgin birth, the life of Christ, the lives of the saints, and the entire spectrum of salvation history were told in wood, stone, and glass--storybooks for the preliterate.

When most people think of literacy, they think of reading books written in alphabetic text. The very name of our organization (IVLA), however, belies our suspicions that there are other meanings to that word. This paper addresses the question, How do we learn to be literate? It makes two arguments: (1) Literacy is an additive, stepwise process describing a movement from nonreader (see footnote) through semi-reader to reader. What we call "visual literacy" serves as the mediating step in the process. (2) Propaganda is the handmaiden of literacy.

## Background Comments

With the reform of the church initiated by Martin Luther the world began to change. It is easy to look back and see changes in terms of revolutions, and we must be careful not to overstate the significance of what at its own time in history may have seemed somewhat less than revolutionary. The basic presuppositions of the Lutheran reform were based on the need of the people to read the Holy Scriptures and understand their meaning. It does not seem overstated to observe that the Reformation was a "Revolution of the Book." It had been a growing revolution, a smoldering fire under Hus and Wycliffe, but under Luther it became a bonfire.

By the year 1500, some 50 years after the introduction of the printing press, about 40 German imprints were being produced annually with issues of about 500 each. In 1517 Luther posted his 95 Theses. In 1519 the Lutheran reform movement had begun in earnest, and there were 111 new titles on the market. By 1523 there were 498 imprints with about 1000 issues each, and Luther himself was responsible for over a third of them. While works in Latin continued to be produced, the use of German began to take first place as the language of the book (see Eisenstein, 1980; Haile, 1976; Strauss, 1978; Scribner, 1981).

## Propaganda and Literacy

Ellul makes the argument that only when there is the ability to read will propaganda be effective (Ellul, 1973;110). His argument is based on propaganda campaigns by 20th century movements (Nazi and Marxist), but the basic characteristics he describes are applicable in our 16th century case study.

Ellul (1973;6-23) lists five important characteristics. First, propaganda addresses individuals and the mass at the same time. Second, propaganda is total in that it uses all media in combination in order to achieve its ultimate goals. Third, propaganda has continuity and duration in that it lasts over time and is repeated with regularity. Fourth, propaganda is organized so that it can exercise control over the people. Finally, propaganda leads from orthodoxy (belief) to orthopraxy (action).

Luther seems to have realized the potential power of the new printing press as a means of reaching the mass of the German people, but before it could be used to its full advantage, some changes had to be made. There was a need for people to be able to read in the language spoken in the streets; not the Latin of the scholars and Church. Initially the presses could be used to provide visual messages much like the woodblock books which served as devotional texts on the lives of the saints, but such visual propaganda was not sufficient to change how people thought. There was a need for control over not only what people saw but also what they could argue and discuss. The printers were the primary means for keeping reform actively before people, and most of the printers were on the side of Lutheran reform. As the dangers of oral communication of ideas increased with the opposition of the Catholic Church, the need for the printed word became more pressing since it could be passed along and discussed wherever people gathered in groups or read in private in the home. Printers, therefore, were at the core of the movement, and from the presses came books, tracts, sermons, and other forms of visually and verbally conceived arguments (Roelker, 1980:57). The old woodblock devotional books were rechanneled to reflect Lutheran ideals, while still maintaining a sense of novelty and interest for the people (Shikes, 1969:14).

By working personally with the printers and graphic artists, Luther used the visual world of the people as an effective propaganda channel. He commissioned Lucas Cranach to do a series of eight cartoons about the papacy, and he was specific about what was to be included in the cartoons which were to accompany verses he had penned (Edwards, 1983:189). As the movement grew, the texts became longer, more verbal, less visual, and more textual.

Thus, Luther used the available media to propagate his own ideas, and he exercised great control over both the verbal and the visual content. He employed the themes and ideas of the people as a means of challenging his adversaries.

## Visual Literacy and Learning to Read

Let us now turn to some examples of the means Luther used to present his ideas. We will see a combination of simple visual images directed primarily toward the visualizer and more verbal messages directed toward the reader, but even the more complex textual messages kept simple visual messages to help explain the text to those who were not as far along in their reading journey.

Mattheus Gnidius (1521) provided a simple visual message for use as a pamphlet illustration (see Scribner, 1981, p. 26 for the visual). Luther is shown standing with Bible in hand facing the Devil who is dressed in a monk's habit. The text is brief, and it is in Latin. The visual message, however, is strong and clear. The spatial relationship of Luther to the Devil tells of victory. A broadsheet (Figure 1) from 1524, Luther Leads the Faithful from Egyptian Darkness, also has a strong visual message which recalls the story of the Exodus victory. Luther leads the common people toward their goal which is the cross. Above this scene stand the pope and the Catholic Church attempting to prevent the escape--the pharoah and the Egyptians. Those who are with the pope are the wealthy and the fools (animals). In both these illustrations, the visual images are far stronger than the text, and indeed, we could understand the meaning without the text.

In contrast, next we have an illustration by Hans Sebald Behem (Figure 2), an artist of Nuremberg, which is accompanied by a lengthy text by Hans Sachs. There is much less action in this visualization, and the focus is on an oral confrontation which is discussed in the written text. We can see that there is a debate between Luther (holding the open Bible) who is followed by a group of common folk and peasants, and a group of wealthy people which includes merchants and clerics. In the printed text, the scene is described as a dispute about simony as a form of exploitation of the faithful. The text allows Luther to speak and teach about specific true doctrines. We read the teaching and we see the action which includes a clear message about who follows whom. We also see more. In the text from the "godless" there is no Scripture reference, but in the text from Dr. Luther and Christ there is Scriptural support. If you have learned to read the dialogue of the broadside, you can go home and read the

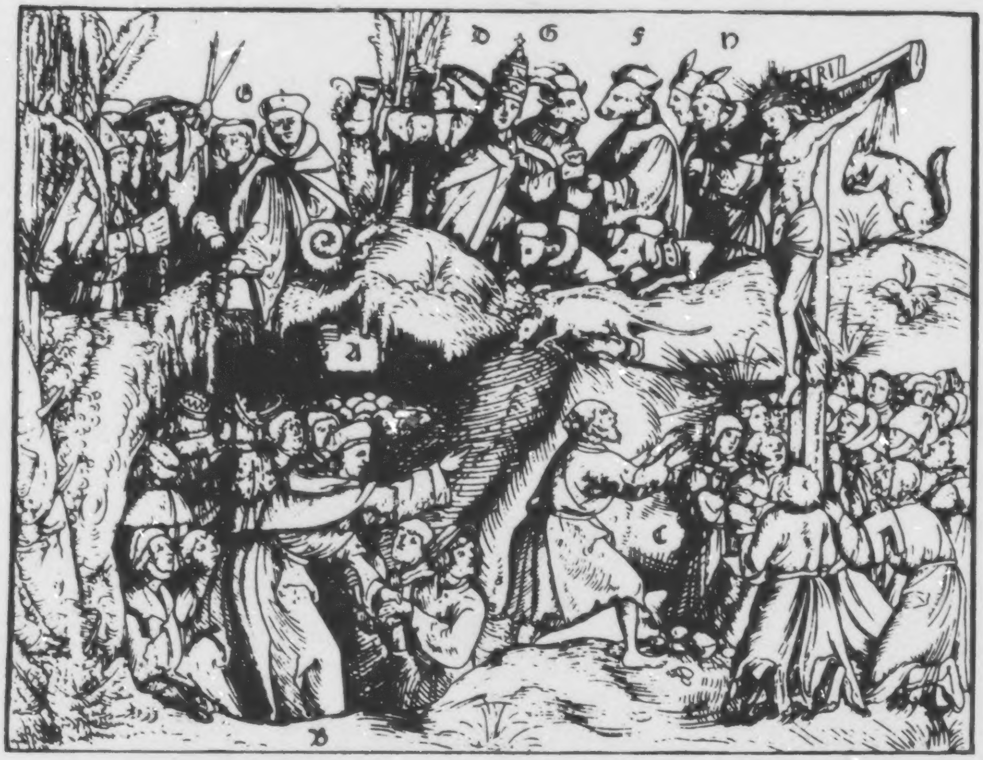


Figure 1. Illustration from Gnidius' broadsheet (1591).
Meaning can be understood without text.

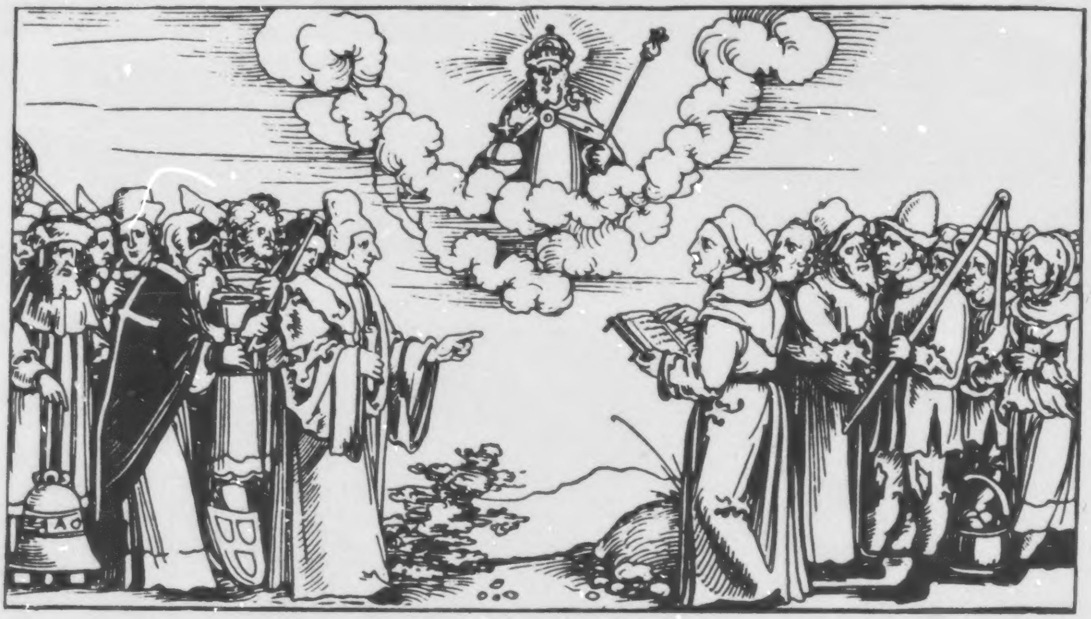


Figure 2. Illustration by Behem.
Meaning lost without Sach's text.

Scripture from Luther's excellent translation of the Bible in vernacular German. Both messages are clear.

In many instances the same visual illustration was used both without and with text. An excellent example of this was a woodcut showing a barn (sheepfold) with Christ standing at the door (Figure 3). The barn also has some characteristics of a church, and we see clergy trying to break in through the roof. At the top is the pope himself, and below a cardinal and bishop are trying to divert the attention of people coming to the barn. There are other themes filling this single panel picture-storybook.

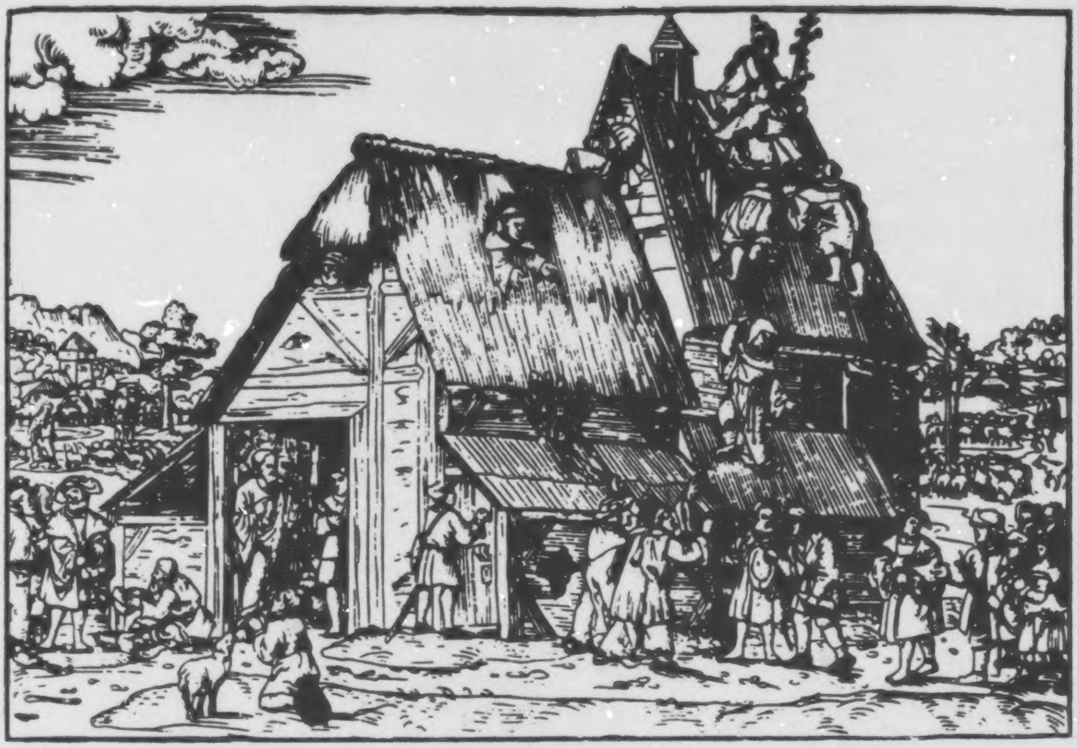
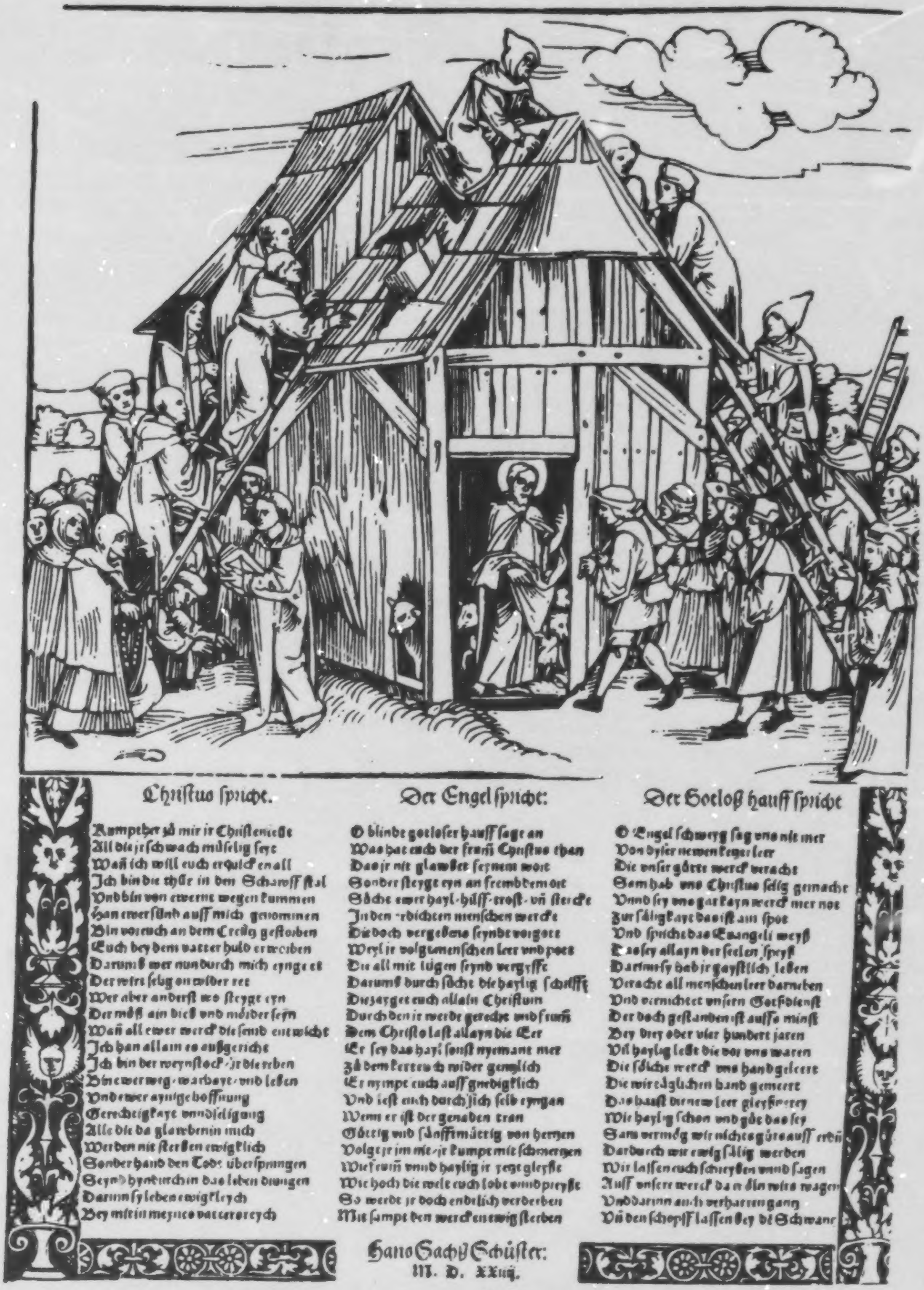


Figure 3. Woodcut without text.

In the next illustration (Figure 4) we have the same theme, but with a difference. The woodcut is by Hans Sebald Behem (1524). We see the clergy attempting to enter by the roof, an angel reads the gospel to women who carry signs of Catholic devotion, and Christ stands at the door with the sheep. The text has been supplied by Hans Sachs, and in it we have three speeches. The first is by Christ and talks about the theme of the sheepfold with himself as the only way to salvation. The second speech is by an angel and calls the words of Christ to the attention of the godless. The third speech is by the godless band who attack the new evangelical teaching as heretical and opposed to divine worship and good works.



### Chriſtus ſpricht.

Kumpt her zů mir ir Chriſtenleüt
All die jr ſchwach müſelig ſeyt
Wañ ich will euch erquicken all
Ich bin die thür in den Schaffſtal
Vnd bin von ewernt wegen kummen
Han ewer ſünd auff mich genommen
Bin vor euch an dem Creütz geſtorben
Euch bey dem vatter huld erworben
Darumb wer nun durch mich eyngeet
Der wirt ſelig on widder ret
Wer aber anderſt wo ſteygt eyn
Der můß ain dieb vnd mörder ſeyn
Wañ all ewer werck die ſeind entwicht
Ich han allain es außgericht
Ich bin der weynſtock / jr die reben
Bin ewer weg / warhayt / vnd leben
Vnd ewer aynige hoffnung
Gerechtigkayt vnnd ſeligung
Alle die da glawben in mich
Werden nit ſterben ewigklich
Sonder hand den Todt überſprungen
Seynd hyndurch in das leben drungen
Darinn ſy leben ewigkleych
Bey mir in meynes vatters reych

### Der Engel ſpricht:

O blinde gotloſer hauff ſage an
Was hat euch der frum̃ Chriſtus than
Das jr nit glawbet ſeynem wort
Sonder ſteygt eyn an frembdem ort
Sůcht ewer hayl / hilff / troſt / vñ ſtercke
In den erdichten menſchen wercke
Die doch vergebens ſeynd vor gott
Weyl jr volgt menſchen leer vnd pott
Die all mit lügen ſeynd vergyfft
Darumb durch ſůcht die haylig ſchrifft
Die zayget euch allain Chriſtum
Durch den jr werdt gerecht vnd frum̃
Dem Chriſto laſt allayn die Eer
Er ſey das hayl ſonſt nyemant mer
Zů dem kert euch wider gentzlich
Er nympt euch auff gnedigklich
Vnd leſt euch durch ſich ſelb eyngan
Wenn er iſt der genaden tran
Gütig vnd ſänfftmütig von hertzen
Volgt jr im nit / jr kumpt mit ſchmertzen
Wie frum̃ vnnd haylig jr yetzt gleyſſt
Wie hoch die welt euch lobt vnnd preyſſt
So werdt jr doch endlich verderben
Mit ſampt den wercken ewig ſterben

### Der Gotloß hauff ſpricht

O Engel ſchweyg ſag vns nit mer
Von dyſer newen ketzer leer
Die vnſer gůte werck veracht
Sam hab vns Chriſtus ſelig gemacht
Vnnd ſey vns gar kayn werck mer not
Zur ſäligkayt das iſt ain ſpot
Vnd ſpricht das Euangeli weyß
Das ſey allayn der ſeelen ſpeyß
Darinn ſy hab jr gayſtlich leben
Veracht all menſchen leer darneben
Vnd vernichtet vnſern Gotſdienſt
Der doch geſtanden iſt auffs minſt
Bey drey oder vier hundert jaren
Vil hayling leüt die vor vns waren
Die ſölche werck vns hand geleeret
Die wir täglichen hand gemeeret
Das haiſt die new leer gleyßnerey
Wie hayling ſchon vnd gůt das ſey
Sam vermög wir nichts gůts auff erdñ
Dardurch wir ewig ſälig werden
Wir laſſen euch ſchreyben vnnd ſagen
Auff vnſere werck da wöln wirs wagen
Vnd darinn auch verharren gantz
Vñ den ſchopff laſſen bey dē Schwantz

Hans Sachs Schůſter:
M. D. XXiiij.

Figure 4. Similar woodcut with text.

BEST COPY AVAILABLE

We have seen texts which supplemented illustrations, but in some cases the text was a part of the original visual and looked much like comics and cartoons of our own day. This was a common practice in both secular and religious works. At times it was difficult to distinguish the secular from the sacred, and the union of the two served useful teaching purposes. For those who could not read the lengthy and more doctrinal content of Hans Sachs, the simpler form was an alternative in much the same way that we have some comic editions of classic literature for poor readers in our own day.

In our next example by Leonhard Beck (1523) we see a monk paying for a farmer's daughter to live with him as his concubine (Figure 5). The scrolls tell us the story.

The monk says,

Father, I will hire your daughter
And bring your affairs into order.

To this the farmer replies,

Monk, you have deceived me,
And made my daughter leave me.

The daughter, holding the monk's hand, says,

Father, I know what's going on
Else I'd not have let the monk come along.

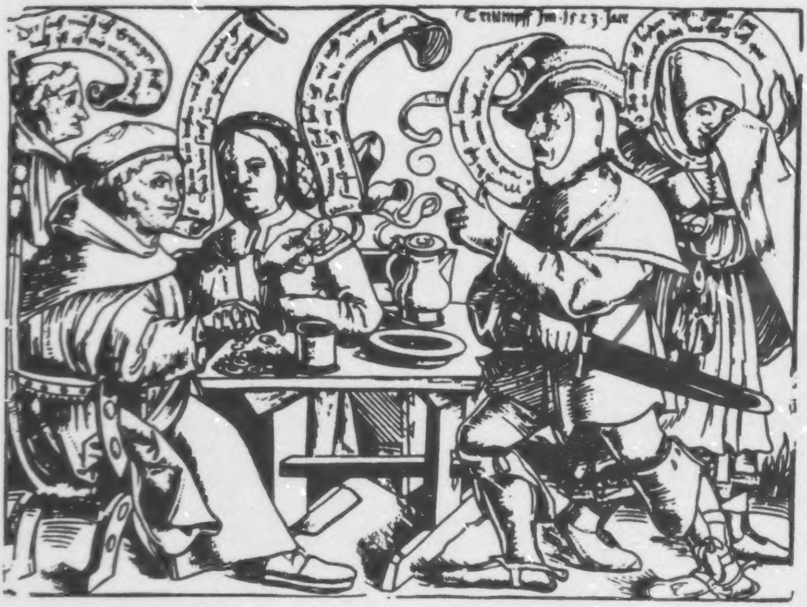


Figure 5. Illustration where scrolls tell the story.

The mother and another monk also put in their short speeches. One of the excesses of the Catholic Church which was often the focus of Lutheran propaganda was the inconsistency of the clergy, and in this simple piece we see how the visual artist becomes the propagandist.

Finally, a major emphasis of the Lutheran reform was the centrality of the sermon and the role of the sacraments in worship, and propagandists made effective use of both visual and textual material to point out these differences.

There were many variations on this theme, and each seems to serve a slightly different audience and function. Some had little or no text as in the case of Figure 6, the woodcut by Lucas Cranach the Younger, which simply shows Luther in the pulpit pointing out the differences between Evangelical and Catholic worship (Figure 6).

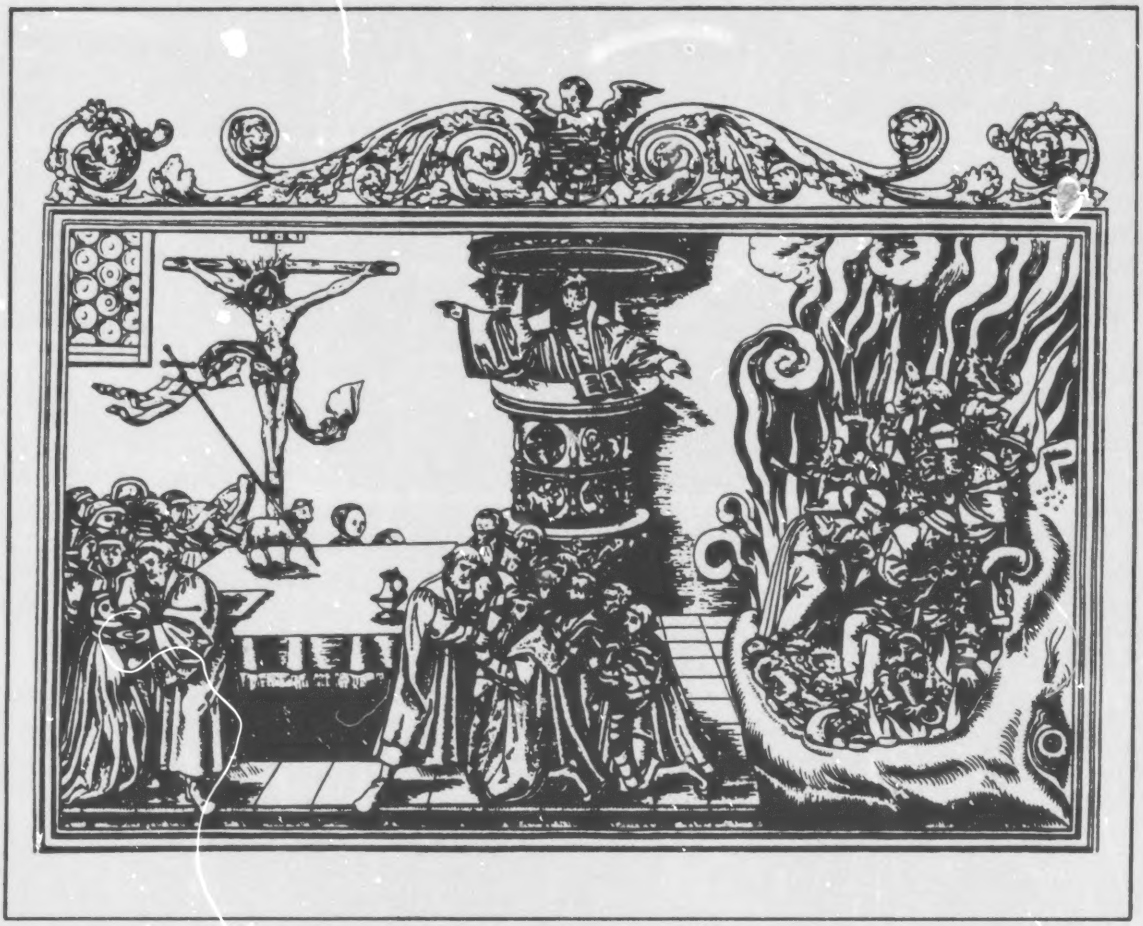


Figure 6. Cranach woodcut with no text.

Yet another piece by Lucas Cranach the Younger is much more elaborate in its visual presentation (Figure 7), but it still has little text though we do have banners and inscriptions in the woodcut to explain the meaning of the symbols and action. For example, the pope is selling indulgences, and on the indulgences are written the words of Tetzel from a 1517 indulgence campaign, "Because the coin rings, the soul to heaven springs." On the pulpit from which Luther preaches are written words from the Acts of the Apostles, and as communion is administered to the people, the words "Drink all of you" have been written with the reference to Matthew.

Finally, we have a woodcut by Georg Pencz (Figure 8) from the later 1520's. Pencz shows two preachers, one Evangelical and one Catholic. We can see the effects of the two types of sermons on the audience. The text which accompanies the visual is not really about preaching, but rather it discusses the content of Lutheran belief as contrasted with Catholic belief.

## Conclusion

The use of visual media coupled with progressively more sophisticated written text as a propaganda tool of the Lutheran movement illustrates the basic principle that the development of literacy is an additive, stepwise process in which the person moves from purely visual messages at the visualizer stage to messages rich in both visual and textual messages at the visualizer/reader stage to messages which can be presented solely in textual format for the reader.

We return to our own period in history and see that the same battles continue; we seem to forget that the process of learning is an active and continuing process which must be reinvented with each new generation.

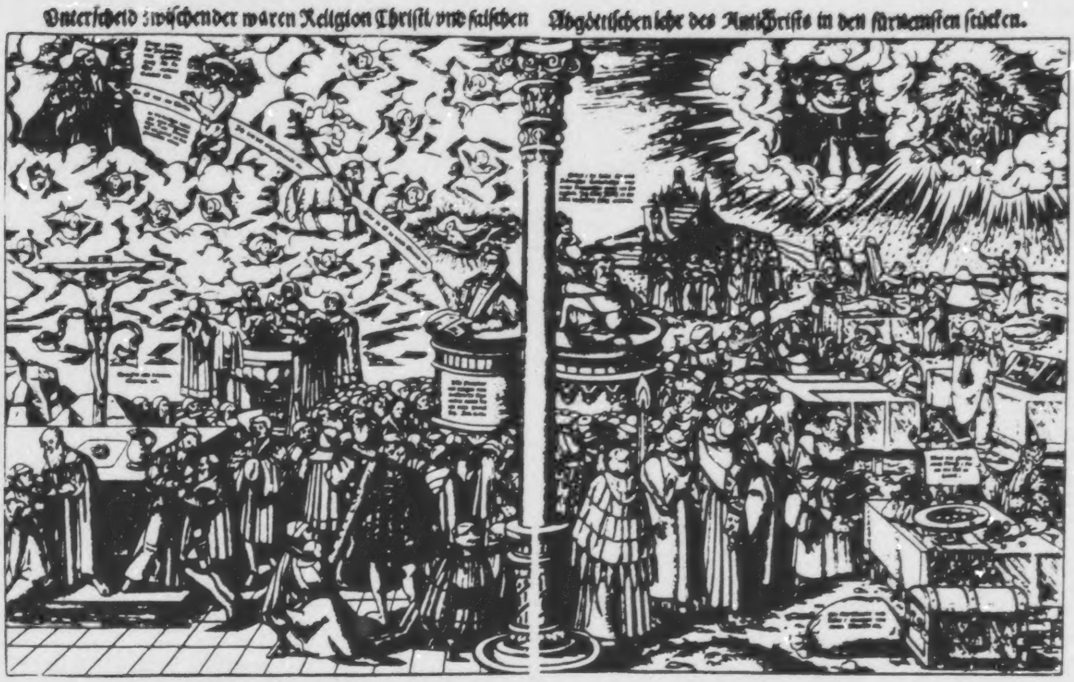

Unterſcheid zwiſchen der waren Religion Chriſti/vnd falſchen Abgöttiſchen lehr des Antichriſts in den fürnemſten ſtücken.

Figure 7. Cranach woodcut with banners and inscriptions.

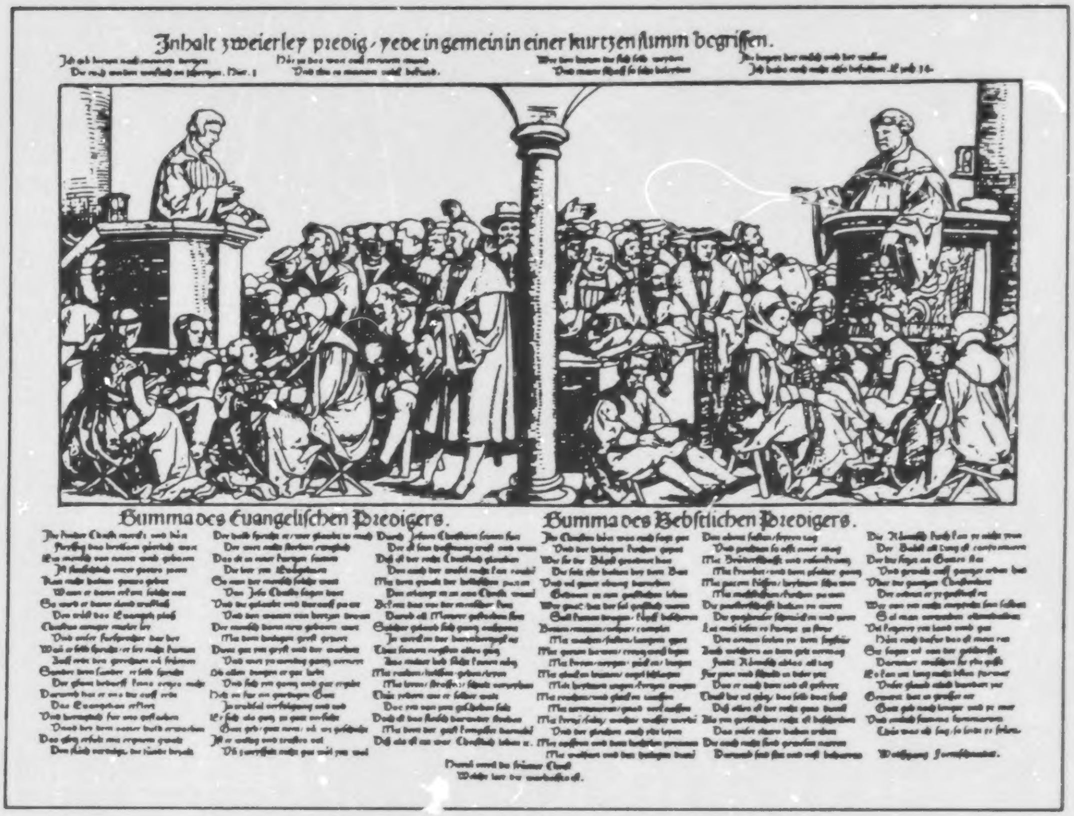

Inhalt zweierley predig/rede in gemein in einer kurtzen ſumm begriffen.
Summa des Euangeliſchen Predigers.
Summa des Bebſtlichen Predigers.

Figure 8. Pencz woodcut with propagandist text.

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## FOOTNOTE

1. In this paper, the term "reader" is used exclusively to refer to those who can comprehend alphabetic characters in text. If our reference is to the ability to comprehend visual information only, we will use the term "visualizer."

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# VISUAL EDUCATION IN BRITISH PRIMARY SCHOOLS: 1983

by

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Visual education in England has its roots in the infant schools (5-7 years old) of the 30's. Prospective teachers learned the value of "sense training" as children used a variety of materials and closely observed the school and neighborhood, recording visually and verbally.

This approach did not appear in primary schools (8-12 years old) until after World War II. By 1967 the Plowden Report not only recognized the new approach but urged its adoption by all English primary schools. Labels varied--integrated curriculum, open school, informal education, etc. The common base was a conviction about the nature of childhood, learning, and schooling. As members of the Plowden Committee wrote, "Children need to be themselves, to live with other children and with grownups, to learn from their environment, to enjoy the present, to get ready for the future, to create and to love, to learn to face adversity, to behave responsibly, in a word, to be human beings" (Silberman, p. 209).

In 1969, when I first enjoyed a working holiday in England, open primary schools were flourishing in all kinds of settings and attracting visitors from many places. I visited rural and urban schools in slum, middle class, and affluent neighborhoods. I saw lively staffs, children excited about learning, and parents and neighbors at home in their schools.

In a truly integrated curriculum, visual learning is a natural part of the whole. I have seldom heard the terms "visual literacy" or "visual learning", but it was apparent in both planned and spontaneous activities. Children covered classroom walls and corridors with their drawings, paintings, and decorated stories and poems. Needlework, carvings, and sculptures were in progress. In a school with six classrooms I saw nine kinds of graphs. Math centers were visual delights, and science experiments were recorded with visual and verbal originality.

A theme was often adopted by an entire school. In one, each class took a turn at turning the long, narrow corridor into a favorite fairy tale. In another, each group mapped a half-mile of the stream running past the school, and a simple survey of the apple orchard and an adjoining hill was made.

Most classrooms were small, though classes ranged from 30-40. Children moved easily into a corridor or outside when it seemed to fit their work. It was exciting to meet children who demonstrated their delight in learning.

While much of this approach can be seen today, things are different. For several years a counter-movement has been developing. Arguments are heard for poor and working class children to receive "basic" education and more affluent children to pay for "enriched" curriculum. As local education authorities have reduced school budgets, charges for busing, school lunches, and supplies are becoming common. Parents in many communities are raising funds through jumble sales to purchase text books and basic supplies. Failing enrollments result in closing neighborhood schools, and teachers are worried about being declared redundant. There is even a vigorous advocacy for a return to the 11-plus examinations after a decade of examination reform.

In the two schools I know best, morale is low. Teachers feel they have little public support and no voice as sections of the curriculum become mandated by the government. They are concerned about the social class bias of some decisions and the growth of testing as the major determinant of school achievement.

In Canterbury, the local education authority transferred the dynamic head teacher and placed the school under the administrator of the middle school nearby. The teachers are trying to divide the work of an innovative, humanistic head but find it is impossible. The all-school Olympic project has been cancelled and other activities involving visual education have been curtailed.

At Wolverhampton, the first action of a new head was to remove everything from the exemplary adventure playground, and the second was to spend a good share of the meager supply budget for workbooks. I correspond with teachers in these schools and know their concerns. They are aware of parallel conditions in America and wonder if there can ever be a return to rich integrated curriculum in either country. Visual education, not a subject but an integral ingredient, suffers.

A final discouraging word concerns the Schools Council. A consortium of local education authorities, the Department of Education and Science, major educational organizations, and lay representatives was long an international lighthouse for research, development, and dissemination of curriculum, ranging from long-range research to small grants for innovative projects carried out by individual teachers. It was jointly financed by the DES and local education authorities and over the years has published a distinguished array of materials.

The Schools Council is now being replaced by a Secondary Examination Council and a Curriculum Committee. The pattern seems to place more control with the government, leaving fewer professional decisions to teachers and heads. The National Union of Teachers has opposed the dissolution of the Schools Council since it was first proposed by the DES, but to no avail. The future of the staff, including field officers, is uncertain.

Members of the examination council have been appointed by the Secretary of State and he will also select members of the curriculum group. Its responsibility is defined as "the limited task of identifying gaps and plugging them."

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# CAMERAS IN THE CURRICULUM: A CHALLENGE TO TEACHER CREATIVITY

by
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This session informed participants about a unique partnership between business and education. Called "Cameras in the Curriculum: A Challenge to Teacher Creativity," the Program establishes a national teachers' competition to select and widely disseminate the best teacher-planned and developed programs which use photography as an integral part of K-12 and higher education curricula. The National Education Association/Kodak Program is administered by the National Foundation for the Improvement of Education (NFIE) and made possible by an educational grant from Kodak.

The program announcement asks applicants to address five elements relating to the use of photography in their classrooms: expected program outcomes; resources that would be needed to implement the program--both human and physical; specific activities that would constitute the program; the potential of the program for replicability or adaptation in other schools; and plans for evaluating the program's degree of success. Interested teachers are asked to specify the subject area and grade level to which their programs are targeted.

NEA's state affiliates screen their state's applications and submit the best entries to the NEA in Washington for judging. A National Review Panel, comprised of teacher leaders and representatives from a cross-section of national educational organizations, then studies these outstanding proposals to choose the best to receive $200 implementation awards. The winners carry out their projects over a four-month period and submit final program reports to NEA. These reports are carefully analyzed by the Review Panel, which selects the top programs. Prizes of $1500, $1000, and $500 are awarded to the winners. Following final judging, comprehensive reports on the top programs, as well as summaries of all the other funded programs, are published in a curriculum volume and shared with colleagues across the country.

The presenter discussed various aspects of the program's successful operation including examples of teacher developed proposals and programs.

# VISUAL LITERACY AND TEACHER EDUCATION: A PEDAGOGICAL STRATEGY

by

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Few individuals would argue the point that media and its accompanying technologies have affected how we communicate, conduct business, form opinions and self-concepts, and maintain and validate selected visions of the world. Pictorial media and its associated technologies, through television, still, and moving pictures, by their mere presence and messages, have infiltrated almost every aspect of American culture. In a very real sense, media (educational and mass media) has formed in part, our consciousness about others and about ourselves. From the 19th century stereograph to the 20th century reconstructed satellite image, media, in its various technological and ideological forms, has played a role in the formation of the human consciousness.

The role of instructional media, which first included photography, and then later film and television, is documented well into the early periods of the 20th century. Photography, the first of the modern mechanically created and reproducible pictorial media to appear in the industrial age, was viewed at that time as a technology through which the wonders and personages of the world could be viewed in the classroom as well as the home (Benjamin, 1955). The photographic image offered to the curious and receptive student a two or three dimensional (symbolic and illusionistic) representation of reality. Compared to the more traditional forms of symbolic representation of that period, oral reports, printmaking, etching, painting, and hand laid type (books), photography provided an efficient, economical, and democratic form of ideological representation and reproduction (Williams, 1974; Real, 1977; Gouldner, 1976).

By the turn of the century the universal language of the photographic image had been incorporated broadly within the educational arena as an instructional aid. Educators of that period used photography in the form of photographs, stereographs, and lantern slides, because it provided what appeared to be an economical, efficient, scientific, and democratic means to aid in the instruction of the newly arrived rural and foreign masses into the dominant American culture: its values and beliefs, its traditions and aspirations (Earl, 1979). It also provided to the American sitting room, as well as the classroom, the means through which to quench a growing middle class thirst for views of the exotic, the different, and the distant. The objective and detailed nature of the lens created for voyeuristic purposes, what appeared to be a truthful reflection of the world as a collection of things to be "looked at." The camera with its fundamental relationship to technology and science, was believed to have recorded and encoded a truthful portrayal of that which appeared before it (Earl, 1979; Muffoletto, 1981; Sless, 1981). In speaking on technology and culture, Kathleen Woodward in her introduction to *The Technological Imagination: Theories And Myths* (1980) provides us with a context through which to view the new 20th century pictorial technologies of photography and film when she states that:

> Technology is usually understood to be part of the domain of economic and functional efficiency, related to rationality, science, and industrial production. . .

The stereograph, lantern slide, and later the educational film provided not only the technology to assist in the mass education of a growing American population, but what will later appear in the late 1950's to the present, an efficient means for packaging and controlling knowledge and meaning: the social and private curriculum (Muffoletto, 1982; Jackson, 1968; Earl, 1979; Newhall, 1964). It was not until the advent of television in the mid 20th century that the 19th century, factory oriented, scientific management philosophy of Franklin Bobbit and Frederick Taylor was seen as possible within American schools (Kliebard, 1971). Audio visual instruction, and later instructional technology, provided not only part of the arena for the development and evaluation of educational behavioral goals as an ends-product relationship, but most importantly provided the technological and philosophical conditions for the packaging of instruction, information, and experience. Thus knowledge, experience, and meaning were created and mediated through educational media (and other various teaching machines) in a manner which claimed to be neutral, scientific, and egalitarian, providing to every student the same quality instruction in the same manner (Apple, 1979).

Accompanying this notion of technology as being rational and neutral was the issue of power and control over the content and form taken by the curriculum, and the experiences and meanings it created (Apple, 1979; Houk, 1974; Jackson, 1968; Lavatelli, 1972; Skinner, 1972; Berger, 1966). In this concept of the packaged instruction, teachers were eventually to be viewed as the managers of the curriculum and not the creators of it. John Haney and Eldon Ullmer, in *Educational Media and the Teacher* (1970) stated this point of view very clearly,

> . . . a teacher is asking too much of himself to try personally to provide all the stimuli required for learning. Let the media do it. The teacher's job is to organize the circumstances that provide the best opportunity for learning. . .

Haney and Ullmer summarize their position by stating,

> In plain talk, once he (the teacher) has the system working (the media) he can spend less time talking and more time on planning and evaluation. He can cease being a drill sergeant and become instead an educational executive.

In this situation the role of the teacher in mediated instruction was understood to be one of management. The function of the teacher was viewed as being limited to planning, implementation, and evaluation of predetermined behavioral goals and objectives (Kaufman, 1972; Gange, 1974, etc.). The media was seen as providing the environment, the knowledge, and the system. The role of teacher, as manager, must have had an effect not only upon the teaching/learning process that occurred in the classroom, but the self-concept of teachers as individuals, and their perceptions of the definition and employment of educational media technology (Berger, 1973.) How one begins to conceive of legitimate symbolic forms of knowledge and the vehicles through which they become transmitted and transformed is an ideological issue as well as an epistemological one.

This attitude towards educational media was also echoed in teacher education programs. Media and its informational and pedagogic significance was ignored completely in the training of teachers. The student of pedagogy was trained to utilize media as a packaged curriculum resource, or as commonly coined, an audio visual aid. Educational media materials were originated outside the classroom and thus, lacked any input by the teacher. Teachers were, and are, usually trained to select and present media packages (usually in the form of a filmstrip, a film, a television program, or computer software) as an adjunct to the written packages found in a text, a workbook, or a ditto. Students pursuing training in teacher education programs, for the most part, are not trained in methods of analyzing and mediating media as another construct of information and pedagogical choice.

Teacher education in the implementation of media technology (I shall at this point limit this discussion of media to include only still photography, film, and television) is predominantly from a management perspective. Located in a report entitled, Educational Specifications For A Comprehensive Elementary Teacher Education Program, University of Toledo, 1968, is a detailed section concerned with teacher education and educational technology. Concerning technology the report begins with the following assumption:

> . . . that the development of technology, specifically as related to education, will have a major impact upon the teaching in the elementary school and, therefore, it is necessary to train teachers accordingly. (p. 2)

The report continues by outlining the training teachers were to receive in the use of educational technology as a pedagogic strategy. The topics in this report on teacher education in a section labeled "Instructional Media and Mediated Instruction" included the following:

(1) Selection and Evaluation
(2) Design and Construction
(3) Utilization of Instructional Materials
(4) Learning Resource Center

The teacher education program in this report offered no social or political analysis of educational media's epistemology, nor any training in the mediation of the medium itself. The report's over-all attitude toward educational technology was that it is a self-contained unit of instruction and all that was necessary for the effective utilization of instructional media was the matching-up of students to the "most appropriate media" (p. 225-247). Again, instructional technology provided the means to what was believed to be a neutral, and objective form of instruction. Technology was, and is, viewed in the words of Skinner, "ethically neutral" (Skinner, 1972, p. 150).

Because of this belief in the neutrality of media, and the creation of media's content and form by curriculum experts and educational specialists, teachers were (are) never provided with interpretive models or with skills to unpack the meanings within the media package. The result was a reification of knowledge and meaning. Because of this, there has developed a non-reflective adoption of the "media resource" or "media aid" as a truthful, scientifically produced, neutral body of knowledge about something. The objectification of the media package fits well with the definition of reification as offered by Peter Berger and Thomas Luckmann in The Social Construction of Reality (1966).

> Reification is the apprehension of the products of human activity as if they were something else than human products . . . . Reification implies that man is capable of forgetting his authorship of the human world, and further, that the dialectic between man, the producer, and his products is lost to consciousness. The reified world is, by definition, a dehumanized world. (p. 89)

If teachers accept the educational media product as an objective and scientific truth, they may well tend to forget the human intervention behind its creation. Once this occurs the relationship of teachers and students to educational media, and its implied knowledge and ideology, will be reified. The educational media text will then fall the same way as the decontextualized written word. The power then of the educational media image will lie in its user's belief in a realist, empirical relationship to reality. In decontextualizing the media image its semiotic system of signification goes unnoticed by its user. The media image is taken for reality itself, and not the subjective, ideological activity of a producer (Gouldner, 1976). Thus, the notion of the individual producer as a subjective and ideological foundation of knowledge is removed when the reified, decontextualized structure of educational media is used in the classroom. In this sense, the teacher becomes the manager or projectionist of the media-based curriculum. And as a projectionist, the teacher has very little power over the mediation of the media experience. Furthermore, because of their own early education and teacher training, few teachers have the reflective models of the analytic skills to decode and mediate the media package as part of a pedagogic system. A study on educational media cannot isolate the media from its social and political context in which it is used.

Educational media is part of that system of curricular materials that aid in the "de-skilling" of classroom teachers (Apple, 1982) into classroom managers. As the classroom curriculum becomes more fragmented under the instructional system approach the job definition of the classroom teacher changes from an autonomous creator to a manager of materials. In this sense, teachers are de-skilled (or un-skilled as a result of training) in the questions and practices of pedagogy. Within the instructional systems approach teachers manage the rate in which the students pass through the curricular materials. Rarely is it the manager's role to manipulate or create the materials themselves, for to do so would be to disrupt the system. The instructional systems approach rarely considers or reflects upon the messages embedded within the material (unless it is built into the system itself), for to do so would question the presumed objective nature of the system itself.

In this study a media package includes all the elements of an instructional (curricular) system that may accompany a photograph(s), a filmstrip, a film or an instructional television program. This would include teacher guides, student workbooks, stated goals and objectives, materials, and tests. An educational system, according to Roger Kaufman in Educational System Planning, is the "sum total of parts working independently and working together to achieve required results or outcomes, based upon needs" (p. 1). A system approach defined by Kaufman is a

> process by which needs are identified, problems are selected, requirements for problem solutions are identified, solutions are selected from alternatives, methods and means are obtained and implemented, results are evaluated, and required revisions to all or part of the system are made so that the needs are eliminated. (p. 8-9)

Instructional systems include pre-packaged sets of curricular materials. These sets usually originate at a few major publishing or production houses which attempt to have their product appeal to the widest possible audience for economic reasons. As Michael Apple sees it (1982, p. 253):

> It is nearly impossible now to walk into an American classroom, . . . without seeing boxes upon boxes of science, social studies, mathematics, and reading

> materials . . . a total set of standardized material . . . which includes statements of objectives, all of the curricular content and material needed, pre-specified teacher actions and appropriate student responses, and diagnostic and achievement test co-ordinated with the system.

Thus models for the utilization of photographs within educational settings must not only consider the form knowledge and meaning assumes within the image(s) (Fiske, 1978; Leach, 1976), but the knowledges, messages, and contradictions that are embeded within the pedagogic image and its instructional system. One writer expresses it this way:

> Interrogation of the content itself is important, not just to see what ideologies are expressed or represented in the material itself, . . . but so that we can begin to both unpack the way any content is itself part of an active process of signification through which meaning is produced (Apple, 1982, p. 266).

Contradiction within an image refers to what is present and what is absent in the text (image) itself that will effect its significance. The meaning of an image "is not only found in the text . . . in its codes and regularities" but also in "the interaction between the text (image) and its users . . . between curriculum content and student" (Apple, 1982, p. 266). Thus a semiotic model for the analysis of educational media will suggest a methodology for the unpacking of meaning embedded within the image--meaning that is found not only within the image, but between the image and its user (Apple, 1982; Muffoletto, 1981).

In the end, this study is primarily concerned with the generation of a model of educational media instruction, one which utilizes semiotics in the investigation of meaning and the reflection of process--a model that will enable teachers to exercise greater control over the educational media (i.e., photographs, film, filmstrips, and television) that are available to them for use in their classrooms and other learning environments. This study, though broad in its implications for other forms of media, will be limited to the discussion and employment of one medium, photography, that is fundamental to both film and television. I have chosen photography because it is historically, technically, perceptually, and psychologically the foundation of other 20th century visual media.

Historically, photography not only provided the technological and aesthetic structure for the emergence of film and video through the development of lenses, shutters, light sensitive material, and cameras, but it also established a social and political context for future media to develop. The social and political context of photography provided the framework for giving significance to the image. This, accompanied with other social, political, and technological developments led to a cultural desire for the photographic image and its by-products

(Taft, 1938). Advertisements use this contextual relationship, as do political photographs (a politician pictured with the assembly-line workers of an auto plant), to create meanings and messages (Hall, 1972; de Camargo, 1972).

The photograph as record and as social memory, became part of the American setting from the year of its invention in 1839 to the present. Photography, and its resulting technologies of film and video, have, and are, playing a major role in the development of the American consciousness, not only in the educational setting, but through the mass media and commercial sectors as well (Real, 1977; Williams, 1974; Nichols, 1981). How teachers use photography, in its various forms, in the dissemination of their curriculum, is related to their experiences and understandings of it (Sless, 1981). Photography in the form of text illustration, filmstrips, still photographs, films, and television, provides learning environments that are different from written text and direct experience (Fiske, 1978).

Photography is, as other media are, a symbolic representation, or translation, of some phenomenon that existed in some other form, either psychologically or empirically (Barthes, 1964). Representation is based upon an organization or system of symbols or signs that relate in some way to what the individual believes to be the "real world" (Arnheim, 1969; Gombrich, 1970). Signs are organized in a way that produces meaning. This organization of meaning is called a code or text (Barthes, 1964; Wollen, 1969; Nichols, 1981). The codes of visual media, such as photography, are different from the codes of written or verbal media. Bill Nichols commented on this difference in his discussion on representation (Nichols, 1981).

> . . . the similarity of text to reality does not just happen: it involves the work of codes. A photographic image, for example, bears a relationship or resemblance to its referent, the thing photographed. If we call this image a sign, then it must be distinguished from the arbitrary signs of the verbal language, which seldom resemble what they refer to. (p. 11)

Signs that hold a resemblance to the appearance of the object they represent are called "iconic." Nichols makes the distinction between reality and signs in this comment on the projected image, ". .. it is not reality up there on the silver screen but iconic signs that re-present reality" (p. 11). How concepts about self are formed in relation to the perceived world is again commented on by Nichols:

> Ideology uses the fabrication of images and the processes of representation to persuade us that how things are is how they ought to be and that the place provided for us is the place we ought to have. (p. 1)

It is an assumption of this study that educational media does just that. It informs the individual of "how things are" and "how they ought to be." It also provides a reference point or address (in time and space) for the individual as to where he or she is in relation to the external world. Put another way, it provides an experience through which meaning is assigned to internal and external phenomena, whereby the individual draws a rational relationship between himself, others, and the objective world (Berger, 1966; Nichols 1981; Popkewitz, 1982; Gouldner, 1976). As stated earlier, part of photography's power is in its ability to mirror or simulate what appears to have objectively appeared before the lens. It does this under the facade of neutrality and science. Photography, says David Sless in Learning and Visual Communication (1981), "is one of the great technological achievements of empiricism: the view that the objects in the world are the only source of knowledge" (p. 93). If photography is related to empiricism, with the resulting image as a source of knowledge and messages, then the disembedding of meaning within the image, overt and covert, becomes a necessary critical skill for teachers who rely upon educational media as a source of knowledge and experience for their students. If we believe that teachers should exercise more control over their curricular materials, it is then critical that they become skilled and assertive not only in the selection and utilization of educational media, but also in the interpretation of the messages embedded within their images.

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# IS ART THE "LITERATURE" OF VISUAL EDUCATION?

by

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I like to go to Art Museums,
I like to look out of their windows.

Gertrude Stein

Literature is used metaphorically in the title of this presentation as a way of calling attention to the educational use of pictures raised to the level of 'literature'. The common ground between literature and the visual arts is that both embody the expression of human ideas--the difference is in the mode, one in words, one in visual images. However the quality that is implied by the term literature is applicable to both forms. This quality is referred to in the definition of literature as a "body of artistic writings . . . which are characterized by beauty of expression and form and by universality of intellectual and emotional appeal" (Random House Unabridged Dictionary, 1966).

Visual art objects embody semantic aesthetic components, as well as structural principles, in their purposefully organized visual effects. These aesthetic and structural dimensions provide several levels of meaning. These multiple levels of meaning contribute power to the usefulness of visual art objects as aids to visioning (as opposed to visual aids). A systematic approach to learning to 'read' the several levels of meaning available in art forms is proposed as an important and manageable type of visual education. This heuristic, phenomenological approach to visual arts products is designed for use in the methods course for classroom teachers.

A rationale for the development of such an approach or system and its purposes, an identification and description of its component actions, and a brief discussion of its use in a teacher education program is offered.

The conceptual foundation for this approach was based, in part, on Feldman's 'Critical Performance Method' (1973), and has been enriched by several studies including those by Woods (1978) and Koroscik (1982). It appears that scholarly interest in 'reading pictures' and 'talk about art' is being considered in concert with the expanding notion of cognition. 'Reading' a work of art seems to involve many skills. These include the skills of intellect and feeling along with a variety of perceptual skills. Practicing these skills in responding to visual art images implies that the effort might be labeled visual cognition and the goal identified as visual education.

In developing a rationale for the introduction of such an approach or method to the education of classroom teachers two questions are considered. First, are classroom teachers to be responsible for the inclusion of visual education in the curriculum? Or, should this educational effort remain within the domain of art teachers? And second, are visual art objects appropriate visual instruments for response activities designed to develop visual skills? Or, are such instructional materials too complex because of the variety of syntactic and semantic dimensions embodied within them? Would it be more effective to use simpler messages of specifically focused instructional aids for visual training? These two questions are addressed in the following material.

First to be considered is the question of responsibility for visual education. Unfortunately, in many schools it appears that visual education is conceived to be the sole responsibility of the art teacher. Although it is proposed that the visual arts provide a literature for the training or practice of the skills of visual literacy, it is important to realize that art teachers do not alone bear the sole responsibility for instruction toward this educational goal. The skills of visual thinking are basic skills. They are not merely nice but are necessary for all. The acquisition and practice of visual skills must become a part of the instructional responsibility of all teachers--an integral part of every content area. While visual art objects provide a 'carrier' for the acquisition of visual skills they are also capable of providing information that is useful in the variety of content embraced within the curriculum.

Another point to consider is the training of the art teacher. The teacher whose training has been essentially in the production of art may not be prepared to teach the complement of art production--that is, response to art. Broudy is concerned with the necessity for both the skills of expression and of impression (1979). It is the latter which are frequently missing from school curricula and which must become the responsibility of all teachers.

The second question about the appropriateness of art objects as instruments of visual education is answered by Ripley who states that "art is the literature of visual training" (1960). There are several reasons why art objects serve well as aids to visioning. First, art objects provide examples of abstract ideas embodied in concrete forms. These aesthetic visualizations assist students in developing their perceptual schema for the ideas. In this way they assist memory. Students also come to understand that one of the most important functions of art is to give visual form to the efforts of the mind, to make ideas into images. Programs which enable students to seek and to see the ideas in visual art provide opportunities for students to develop visual thinking skills. And, as the students interact with art, they will not only practice visual skills, they will 'learn' the images as well, and thus develop a vital store of remembered images.

Another reason supporting the use of visual art objects for visual training involves the limitations of those visual images specifically designed to deliver instructional rather than aesthetic messages. The visual content of these so-called aids to vision is often extremely narrow. Images which have been reduced in their visual content to make recognition or identification easier may be deterrents to a more comprehensive visual education. The perceptual skill of extracting information, of 'reading the image,' may be short circuited and thus never activated (Salomon, 1979). Further, an extensive diet of mediocre graphics may cause severe imagery deficiency and may become the determining criterion of the student's 'taste' for pictorial materials.

In contrast to the limited visual offerings of many teaching aids, the visual arts offer a bounteous buffet of authentic art objects and artifacts which, in addition, present the rich and complex imagery of world cultures. The usefulness of these resources for visual education must be exploited in the education of classroom teachers and, as a subsequent consequence, in their students. Reading the images of art exercises visual skills far more than merely looking at and labeling common objects. More perceptual skills seem to be required and to be practiced. The unique nature of the symbol system of significant art is not embodied in simple, single meanings, but involves multiple meanings. The Krietlers (1972) refer to this as multileveledness, while Goodman (1968) uses the term density. Both of these terms suggest that art forms, unlike teaching aids, are never 'used up'. Even when a work of art becomes familiar it may not be known or understood completely. "Both the dynamics and the durability of aesthetic value are natural consequences of its cognitive character" (Goodman, 1968).

## VISUAL SKILLS THROUGH ART

The acquisition of visual skills comprises a visual education which leads to visual literacy. However the progression of visual skills may be thwarted at its outset through a common educational practice which teaches us to label the pictures we are shown. Looking at art requires a different response set than recognition, naming, and closure.

One of the first skills necessary in visual education is the ability, or skill, to respond with an attitude of openness to that which is available to the eye--a deliberate attempt to delay closure--a closure represented by knowing what it is and having the label to prove the knowing. The teacher must make an active effort to develop in students the ability to stay with the seeing process a longer period of time than is required to label what is immediately seen. This process necessitates activities or tasks designed for this particular purpose.

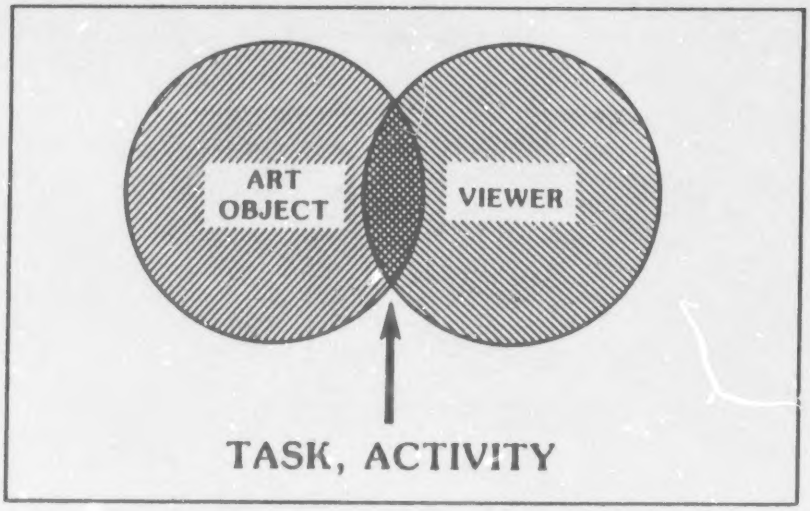

Figure 1. Visual information and viewer relationship.

Figure 1 represents the visual information and viewer relationship, and identifies, through the arrow, the critical necessity of the task or activity which brings the two together. The activity provides the point of focus--having something to look for, not merely something to look at. Teaching skills practiced in guiding visual attention and curriculum design skills in planning appropriate activities are implied by the task. These are accommodated within the method.

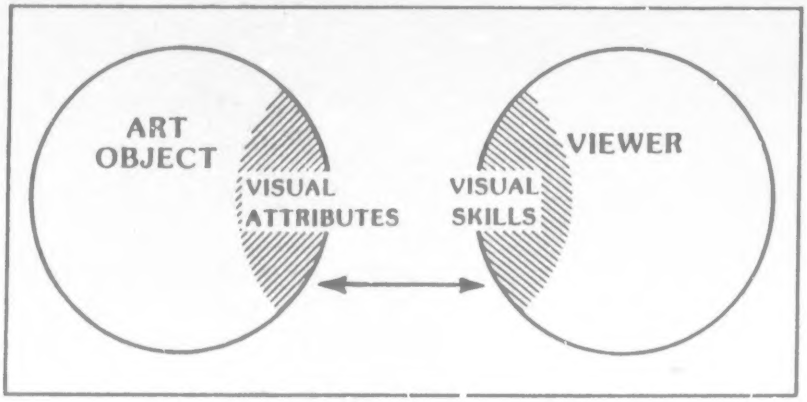

Figure 2. Overlap between visual skills and visual attributes.

Another version, Figure 2, separates the two, viewer and viewed, to illustrate the content of the overlap--visual skills of the viewer activated in attending to visual attributes of the art object. It is also important to consider the difference in the active and passive nature of the two. The viewer is active--the art object is there--it does not act or 'do' anything.

Arnheim (1974) recounts that vision is an active grasp. The grasp is for meaning. Meaning is the purpose or goal of active seeing. Sometimes meanings are taught as though they are inherent in the objects used to teach them. Caution must be exercised. Meanings are within people, not within objects. The way individuals acquire meanings for the visual objects and events of the environment is an important and essential understanding for teachers. Using the visual arts as a basis for this development means that the teaching tools must represent the highest quality available and that the tools will be 'learned' along with visual skills practiced in extracting or 'reading' the information. Obviously there are different skills operating at various levels relative to the types of visual information that are available in the image. A systematic approach to these levels of meaning is proposed as a way of developing such visual skills.

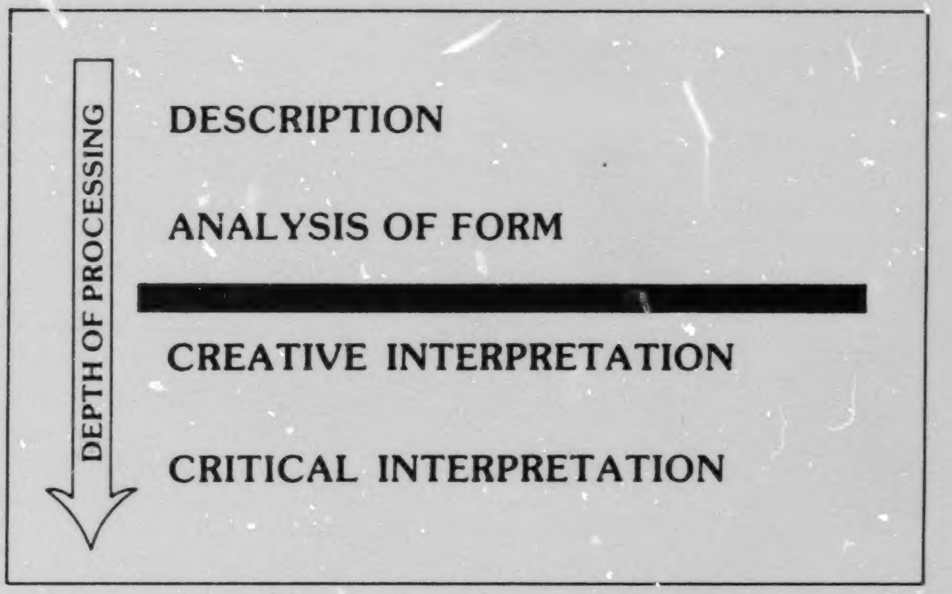

Figure 3. Levels of information.

Figure 3 represents an approach to 'reading' pictures which identifies as separate categories the levels of information or tasks to be sequentially addressed. Although the levels of this system might represent four separate approaches to works of art, the levels are combined to form a single, systematic approach. The levels within this system appear to represent a gradually increasing depth of processing and, in this way, refer to processing skills--which, due to or cued by the visual content, may be considered visual skills.

The solid line dividing the system into two sections is significant for the art object--What is it, and tasks that require a mental stretch into the symbolic nature of the visual material found as a part of the art--What it means. The tasks of the top section deal with knowledge that is directly accessible through the visual.

The visual skills of observation, of seeing details, and of analytic perception of the overall pattern, are practiced through the description and analysis of form levels of the system. Anderson (1979) says "our memory for meaning is longer lasting than our memory for physical details. When we attach meaning to something we remember it . . ." (otherwise it may remain part of the visual noise that surrounds us--out there--but not in our minds). The necessity for meaning suggests that it is important to go beyond identifying the physical visual attributes of the art to the meanings that are embedded in its appearance. A more complex inclusive schema anticipatory to our viewing and coming to know efforts must be developed.

The tasks of the bottom section involve practicing the visual skills of extracting symbolic connotations from visual art objects. This is a mental stretch called interpretation. By using a spatial metaphor for activity of the mind, reference to the sequential effect of the levels of deeper processing can be made. Sequential attendance to the system levels requires processing efforts that involve further or deeper exploration of the schema which are called to attention by the visual material in the art. Prior knowledge, time involved in looking, and the task or activity demands are critical aspects of the depth of processing model (Craik & Lockhart, 1972). The lower portion of the diagram refers to deeper processing skills and consists of two types of interpretation of the art object. Creative interpretation involves generating personal and expressive meanings for the visual content--a sort of mental elaboration through personal association. Critical interpretation involves hypothesized meanings cued by the visual content but related to outside knowledge sources.

The division of the lower section of the system into two types of interpretation is one of the most controversial aspects of it. The conceptual and operational evolution of this division and further description of each of the types may be useful.

In working with less skilled viewers, it was found that the art historical approach encompassed by interpretation as defined by Feldman (1973) lacked differentiation in accommodating responses dealing with personal and expressive meanings. This lack initiated the division of interpretation into two different response sets labeled creative interpretation and critical interpretation. The division was, in part, motivated by a statement made by the principal of a local elementary school. In talking about the uses of art images for teaching purposes, she said: "But a picture can mean anything." This was a disturbing comment. What is the relationship between an art object and its meaning? At what level or in what context can a picture evoke such a breadth of meaning? Should such meanings be denied, especially for novice viewers of art? Creative interpretation permits a response option in which the work of art may, in fact serve as a limited projective device--an opportunity to draw upon the rich differences of experiential background to derive personalized divergent meanings. This response level serves a useful purpose in making visual content personally accessible and not gated by authority.

When the expressive meanings of art are personalized in a shared context enriched perception is provided. As hypotheses of meaning based on what is seen--that is, what has been described--and how the form has been analyzed--creative interpretation serves to enrich the concept of symbolic reference. The visual imagery of one may open doors to the visual memory store of others. This is learning through art, not about art.

Further support for the level of creative interpretation is provided by Marcel Proust if the reader substitutes "a work of art" for Proust's use of the word 'book'.

> In reality, each reader reads only what is within himself. The book is only a sort of optical instrument which the writer offers to the reader to enable the latter to discover in himself what he would not have found but for the aid of the book (Winner, 1982).

Art, as symbol, can evoke both subjective and objective responses to the expressive and aesthetic qualities that may be seen. Learning to read and comprehend expressive visual qualities and learning to read and comprehend aesthetic visual qualities are equally important to visual literacy. Olson (1978) has described two functions of symbols in cognition--two ways which contribute to knowingness or comprehension. The first of these is representation--re-presentation--which refers to the expression and explication of already stored ideas and feelings--creative comprehension. The second function of symbols is an epistomological or learning function--through the acquisition of new knowledge about oneself or one's environment--critical comprehension. In several ways these two functions of symbols match the intent of Creative Interpretation and Critical Interpretation. Olson further suggests that the expressive function of symbols in thought precedes the knowledge function and it is for this reason that creative interpretation comes before critical interpretation in the proposed system.

The second type of interpretation, critical interpretation, involves the development of the ability to recognize in works of art a variety of types of visual information and cues which refer to aspects of the world that are known or may be learned. Visual information which illustrates or symbolizes aspects and ideas of history, aesthetics, cultures, economics, politics, science, math, and technology can be seen through the windows provided by the visual arts. The visual arts, defined as "the selective communication of human experiences in tangible forms existing as matter in space" (Gardner, 1970), provide an access to a wide range of human ideas in concrete imaginal-visual forms. All forms respected as art are the product of human intelligence--a decision making process--operating at some level or levels of consciousness. Therefore, art represents idea.

Pictures--works of art--are carriers of ideas. When this fact is placed beside the evidence that pictures are easier to know--and perhaps to remember--the pictures become a valuable communication--a learning device. Pictures become a device which is capable of providing a wide range of human conception to visual access. The artist can select and present for our eyes the essence of an idea or object. This essence may be revealed more completely in the painted object than in the real object. It may be more real and comprehensible in a perceptual--not an optic--sense. This is one way in which art is articulate--and different from other visual educational materials where only the obvious is shown. This symbolic knowledge available through the work of art is probably accessed at the deepest level of processing. This is the knowledge that is addressed in critical interpretation and which forms the basis of more comprehensive hypotheses of meanings for the art. It brings to closure the process of 'reading' the visual content of a work of art--a process which may provide for the practice of visual skills.

This sequential revelation of the cognitive content available in works of art is introduced to preservice classroom teachers in a required course called aesthetic education. Prior to involvement in this systematic approach to reading pictures recognized as art, the students have been engaged in learning episodes in which they identify, define, and practice recognizing elements and structural principles of organization in a variety of arts contexts. They have also explored the symbolic function of visual forms through activities in creating and in responding to metaphoric and analogic visualizations of ideas. The system itself is introduced and practiced during a field trip to the galleries housing the permanent collection of the Carnegie Institute Museum of Art.

A course assignment enables the students to return to the permanent collection on their own, to select a painting, and to practice the process. Students submit a written record of their sequential 'reading' of their selected painting. They also design a teaching episode for children in which the painting serves as a teaching resource.

Several aspects of the teaching and practice of this method of 'reading' pictures are now being studied. The first of these is the development of a taxonomy of visual skills related to each of the levels of the proposed system. Another area of research interest is the effect of prior experience on the ability to acknowledge and articulate the several layers of meaning found in visual arts objects. A third related effort currently underway is the design and testing of a computer assisted tutorial program that will give students practice in using the system by responding to selected reproductions.

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# VISUAL/SPATIAL STRATEGIES FOR WRITING AND READING IMPROVEMENT

by
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This paper highlights two visual literacy strategies which serve to strengthen writing and reading proficiency of students at all age and grade levels. The use of one strategy, visual compositions, is based on the organized arrangements of pictorial, analogic materials while the second is based on the conceptual arrangements of spatial, configurational displays. Both strategies express a cognitive undertaking by the teacher in that the holistic strengths inherent in visual literacy are used as the means to increase written literacy development and organization.

Informational, organizational writing does present a problem for many students because they are not shown, in the first place, how to organize content. Hennings (1982) pointed out that youngsters are given little opportunity to develop how expository prose is structured and how conceptual and relational content is organized for reading and writing. One reason why students from lower socio-economic levels in particular exhibit difficulty in organizing their writing is because they need to be shown how to use forms and sentence sense in their composing (Chall & Jacobs, 1983). Reading and learning disabled youngsters experience, as well, major difficulties in both the recall and organization of verbal information. Wong (1978) emphasized that their reading and language disabilities are due in part to problems with recall and organization while Bauer (1977) felt that deficient organizational strategies in the learning of verbal material caused a slower learning rate with learning disabled as compared to normal children. More recently, Maier (1980), suggesting global approaches to mental organization, indicated that the learning disabled are unable to integrate receptive language experiences at a verbal or higher level and that they do not organize the information they receive adequately enough to develop acceptable categorization skills basic to higher cognition. The two visual/spatial strategies developed in this paper will indeed show teachers how to achieve both global and organizational approaches to develop written literacy proficiency for all levels of students.

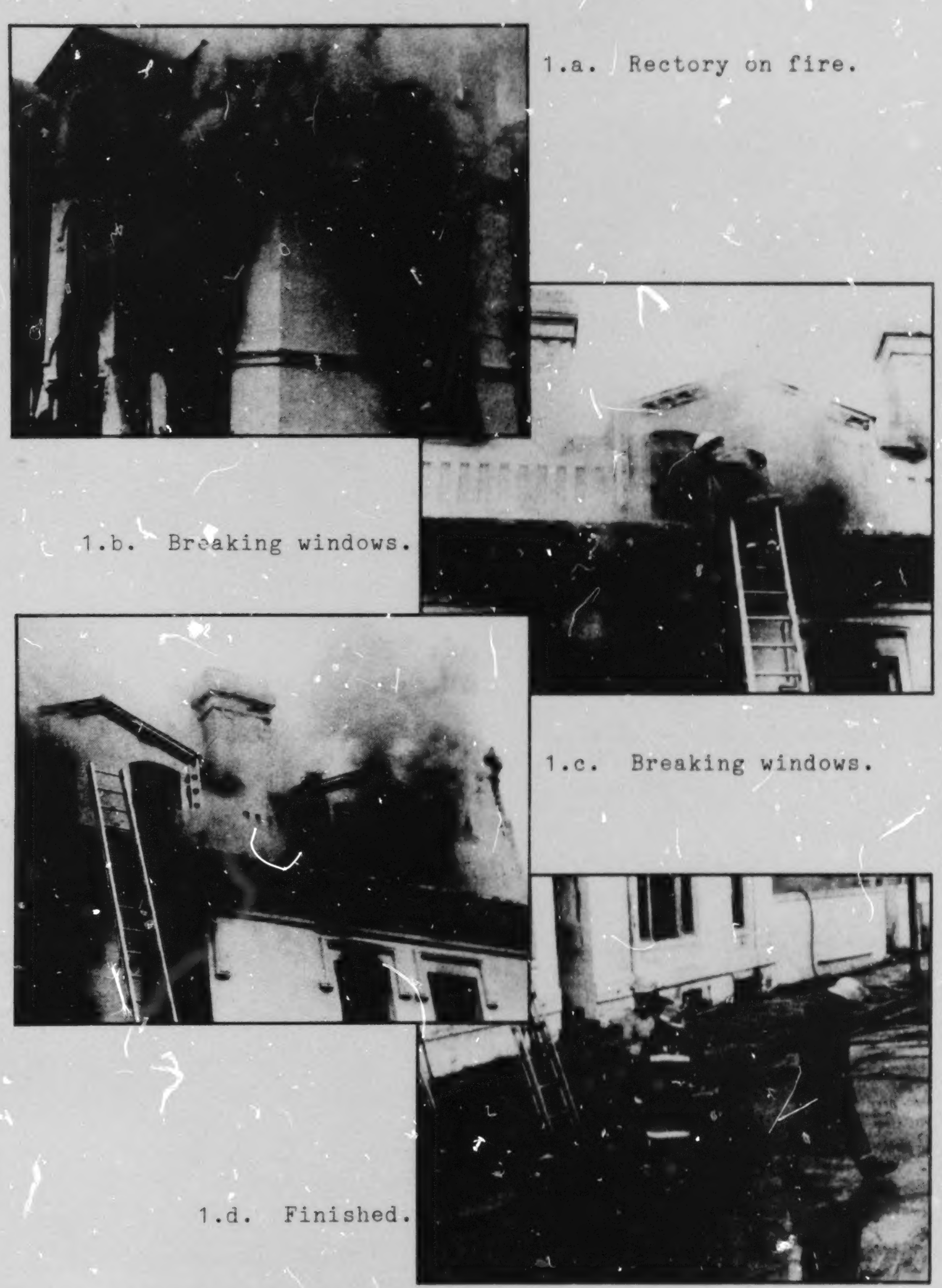
## Visual Compositions: Analogic Representations

Visual composition strategy allows for the use of analogous representation and, thereby, use of the known, the concrete, to influence written literacy development. Because photographs or slides are replicas of real life situations, they offer concrete glimpses of life that students can match with their own verbal accounts. Most importantly, a visual composition involves the use of more than a single picture; it is a collection of photographs, pictures, or slides that suggest or imply a unified theme. The visual composition provides a nonverbal, holistic way of conceptualizing a theme and a way of eliciting and organizing a written composition. The advantage of using "silent" sequences of pictures rather than film with accompanying dialogue is that students don't imitate a language source but compose their own logically produced written accounts to report, record, generalize, and speculate about what is happening. For instance, students who see a series of slides displaying garbage and waste in particular environmental locales are encouraged to write a composition about the ugliness of pollution, while students who see the mishaps of a beginning skier under the tutelage of her ski instructor are motivated to write either an essay of persuasion or one of speculation about the neophyte's future on the slopes.

While visual compositions can be prepared in four major ways (Sinatra, 1983a), this paper will focus on the use of the strategy as a teacher-directed device to aid students in the conceptualization and organization of theme. In this use of the technique, teachers photograph their own visual stories or arrange any combination of photos or slide essays from the storehouse of pictures available in the family photo albums. The key is arrangement and rearrangement of pictures, in that they relate to a central theme. At least seven visual composition arrangements can be put together to influence the writing and understanding of seven corresponding styles of written discourse (Sinatra, 1983b).

Generally, two showings of each visual composition are necessary to develop holistic understanding of the theme and sentence level relationships. During the first visual presentation, students sense the contribution of each picture to the development of a unified theme. They should be asked to compose and write a thematic sentence which expresses that central meaning and which provides a point-of-view for their developing theme. During the second viewing of the visual story, students can write individual sentences based on each picture. The important visual/verbal strategy to impart to students is the notion that as each picture contributed a thread of meaning to the visual composition, so each sentence should relate to the central idea expressed in the thematic sentence.

For instance, the four pictures displayed in Figure 1 come from a longer visual composition arrangement of 14 slides. They were photographed while the author was leaving a professional meeting in Norfolk, Virginia and noticed, several blocks away, a rectory attached to a historic church on fire. From the 36 exposures taken, 14 were eventually used in a visual composition that portrayed a narrative-type format. An episode, the burning rectory, was shown in the first two slides followed by a series of events which led to the fire coming under control. The events



1.a. Rectory on fire.

1.b. Breaking windows.

1.c. Breaking windows.

1.d. Finished.

Figure 1. Four pictures from a visual composition.

started with a singular fireman ascending a ladder, followed by his strategy of smashing in a number of windows on the upper level of the rectory, and concluded with his unheralded completion of the job.

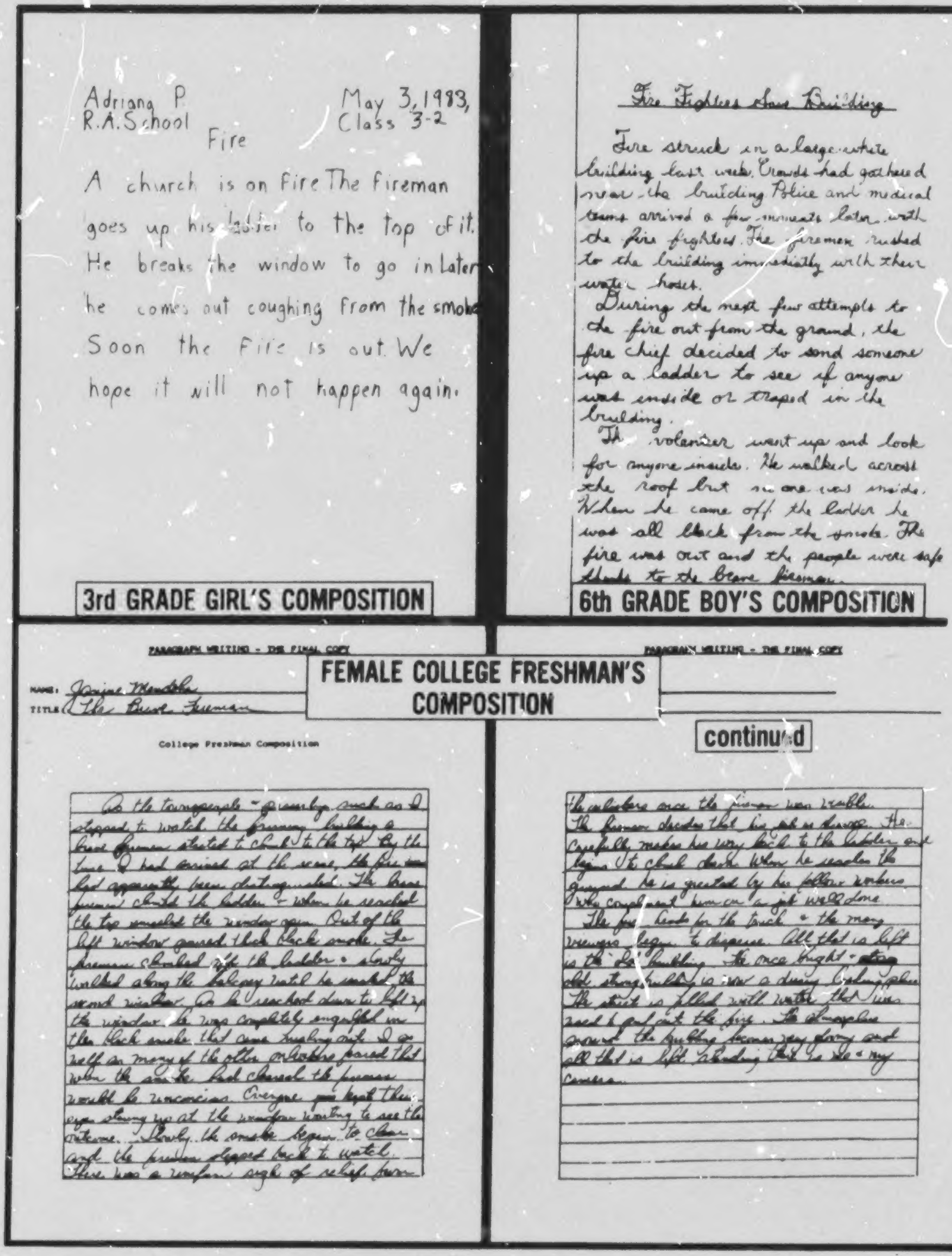
From the hundreds of school-aged youngsters who have written compositions based on the visual presentation of the 14 slides, three representative samples have been selected to illustrate the mental processing of the writers. (See Figure 2) Please note that while the level of language and theme and sentence complexity may vary among the third grade, the sixth grade, and college freshmen writers, the organization remains essentially the same. They all wrote in a narrative format.

Inspection of all other compositions written on the same visual topic will reveal a similar tendency to write in narrative style. Furthermore, when the organization of the visual composition changes, the writing of the student viewer will change.

## Semantic Mapping: A Type of Nonverbal Metaphor

Semantic mapping, also known as semantic webbing or semantic networking, expresses a type of configurational metaphor representing the organization of a reading selection or forthcoming composition. In analogous representation, pictures represent actual experience, but in metaphorical representation, a graphic outline or "blueprint" suggests a particular type of selection organization or conceptual relationship. Metaphorical representations such as those expressed through semantic maps compact a great deal of information into a single configuration and include as well the world of maps, graphs, diagrams, timelines, and flowcharts. Because of their wholeness and compactness of form, such configurations can serve to represent a great deal of verbal information. This notion is often overlooked by teachers of written literacy.

When students are taught uses of nonverbal metaphors through construction of graphic arrangements, they are aided in the conceptualization of idea and in the organization of written text. A key feature in helping students to read and write in more logical fashion is to originate lessons in which the construction of maps and graphs precede the assignment of the reading and writing assignment. When students compose the nonverbal relationships needed to complete the diagram, graph, or chart prior to reading or writing, they will have established connections amongst major and minor ideas of a topic. A fallacy in the use of graphic aids in junior and senior high schools is that the graphical displays and arrangements are often used to embellish text and students are not shown nor encouraged how to "read" these compact units prior to textual reading. In essence, teachers from kindergarten to college can have students conceptualize ideas in a number of graphic, configurational ways prior to reading and writing experiences (Sinatra & Stahl-Gemake, 1983).



Adriana P.
R.A.School
May 3,1983,
Class 3-2

Fire

A church is on fire The fireman goes up his ladder to the top of it. He breaks the window to go in Later he comes out coughing from the smoke Soon the Fire is out We hope it will not happen again.

**3rd GRADE GIRL'S COMPOSITION**

Fire Fighters Save Building

Fire struck in a large white building last week. Crowds had gathered near the building Police and medical teams arrived a few moments later with the fire fighters. The firemen rushed to the building immediatly with their water hoses.

During the next few attempls to the fire out from the ground, the fire chief decided to send someone up a ladder to see if anyone was inside or traped in the building.

Th volenteer went up and look for anyone inside. He walked across the roof but no one was inside. When he came off the ladder he was all black from the smoke. The fire was out and the people were safe thanks to the brave fireman.

**6th GRADE BOY'S COMPOSITION**

PARAGRAPH WRITING - THE FINAL COPY

NAME:
TITLE: The Brave Fireman

**FEMALE COLLEGE FRESHMAN'S COMPOSITION**

College Freshman Composition

PARAGRAPH WRITING - THE FINAL COPY

**continued**

Figure 2. Representative writing examples.

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A map or a web is a graphic arrangement showing the major ideas and relationships that exist in a printed text or amongst word meanings. The map consists of "nodes" which can be drawn in circles, rectangles, or squares containing key words or phrases and connecting links in the form of lines or arrows drawn between the nodes. Teachers could make use of meaning inherent in certain figures used in flow chart language; for instance, use of the circle generally means program start or finish, a triangle means that a decision is to be made, while the rectangle holds the operations expressed in the program. Fredrickson (1975) has described semantic networks as graphs consisting of semantic "tokens" or "concepts" connected by relational links. Others have called these semantic concepts "nodes" or "entities" (Hardin, 1983) in efforts to differentiate the visuospatial quality of the semantic information from the network links or connectors.

One appeal of the mapping procedure is undoubtedly due to the practical, holistic way it integrates schema theory with reading comprehension. Schema theory, an extension of Piaget's beliefs, attempts to explain the essence of comprehension by proposing that what is understood during reading or listening is linked in some conceptual way with what existed in the mind of the learner beforehand. Piaget (1952) described schemata as mental images or patterns of actions which represent experiences. As children interact with the environment, they construct mental models of how the world operates and file these images into a massive network of concepts which are modified as new learnings are integrated with old ideas. These abstract cognitive structures become hierarchically arranged so that concepts at the top of a class capture the essential aspects of all attributes with the class. Thus, when the teacher constructs an informal diagram or semantic map on the chalkboard, students see how ideas mesh with the previous knowledge they have about the topic.

A second appeal of the mapping or webbing procedure is the graphic way it conceptualizes content. Unlike a linear outline, semantic maps, with their spatial configurations of nodes and linking lines, visually display relationships that show how ideas are connected. Since maps can be constructed with students before, during, or after reading, students are also given time to organize and integrate their ideas about the selection as the whole map conceptualization remains in view.

## Map Usage and Reading Comprehension

Use of the mapping technique has been advocated by theorists and practitioners as a way to strengthen reading comprehension. Pearson and Johnson (1978) proposed that semantic maps can be developed with students to build and extend vocabulary comprehension and to expand their intuitive notions about the similarities and differences among concepts. Later, Pearson with Spiro (1982) suggested that when a reading assignment is completed, students can collectively modify, amend, or correct a pre-reading map to verify their knowledge. Davidson (1982) pointed out that the aim of the whole-class mapping activity actively requires students to interpret their pre-existing knowledge and experiences while helping them recall and retain text information. Freedman and Reynolds (1980) showed teachers how to construct maps from basal reading selections in order to help students predict story events. More recently, Cleland (1981) showed teachers how to generate three types of semantic webs--the episodic web, the inductive web, and the emotions web--to help remedial second grade readers organize relationships among story characters and events.

While the literature has reported success with the mapping procedure from a practitioner's viewpoint, comparatively little research has been conducted to determine if map usage before, during, or after reading would significantly increase comprehension when compared to any other strategy. Types of semantic networks have been used successfully in research designs by Crothers (1972) and Fredrickson (1972) with older undergraduate students to examine effects in discourse comprehension.

Then, Sinatra, Berg and Dunn (in press) wished to determine the effect of the mapping procedure upon reading comprehension for a small group of learning disabled youngsters. They presented the semantic map as a pre-reading activity and compared the comprehension results obtained after silent reading with that of a more traditional, verbal and discussion approach in preparation for silent reading. In 11 of the 15 trials, comprehension was stronger when the mapping procedure was used to graphically outline the story before reading. In three instances, comprehension scores remained the same for each approach and in only one instance was comprehension stronger when the traditional discussion approach was used prior to silent reading. In a second study, recently completed at the St. John's University Reading Clinic, 27 youngsters with reading problems were assigned to 27 different graduate interns who covered ten reading selections at appropriate reading levels with each youngster. In five reading selections, the teacher presented the vocabulary and concepts through discussion and word attack strategies, the traditional readiness approach, and in the five additional selections the vocabulary and concepts were presented through one of three map-type formats. The type of map used was generally dictated by the selection organization; for example, the episodic map was used for narrative content, the thematic or descriptive map was used for theme development, and the classification map was used for development with expository selections (see Figure 3 for graphic outline of these maps).

Results comparing the mapping procedure with the verbal-oriented readiness approach showed that in 19 of the 27 cases, the total comprehension score based on the five selections was greater when the mapping procedure was used. In two cases, the comprehension score was the same for both approaches and in six cases, comprehension was stronger under the verbal approach. For all 27 students, the mean number of comprehension questions correct under the semantic map approach was 27.9 while for the verbal approach the mean number of questions correct was 35.9. The mean difference of 2.0 in favor of the mapping approach was significant at the .05 level ($t$ = 2.41, df = 25).

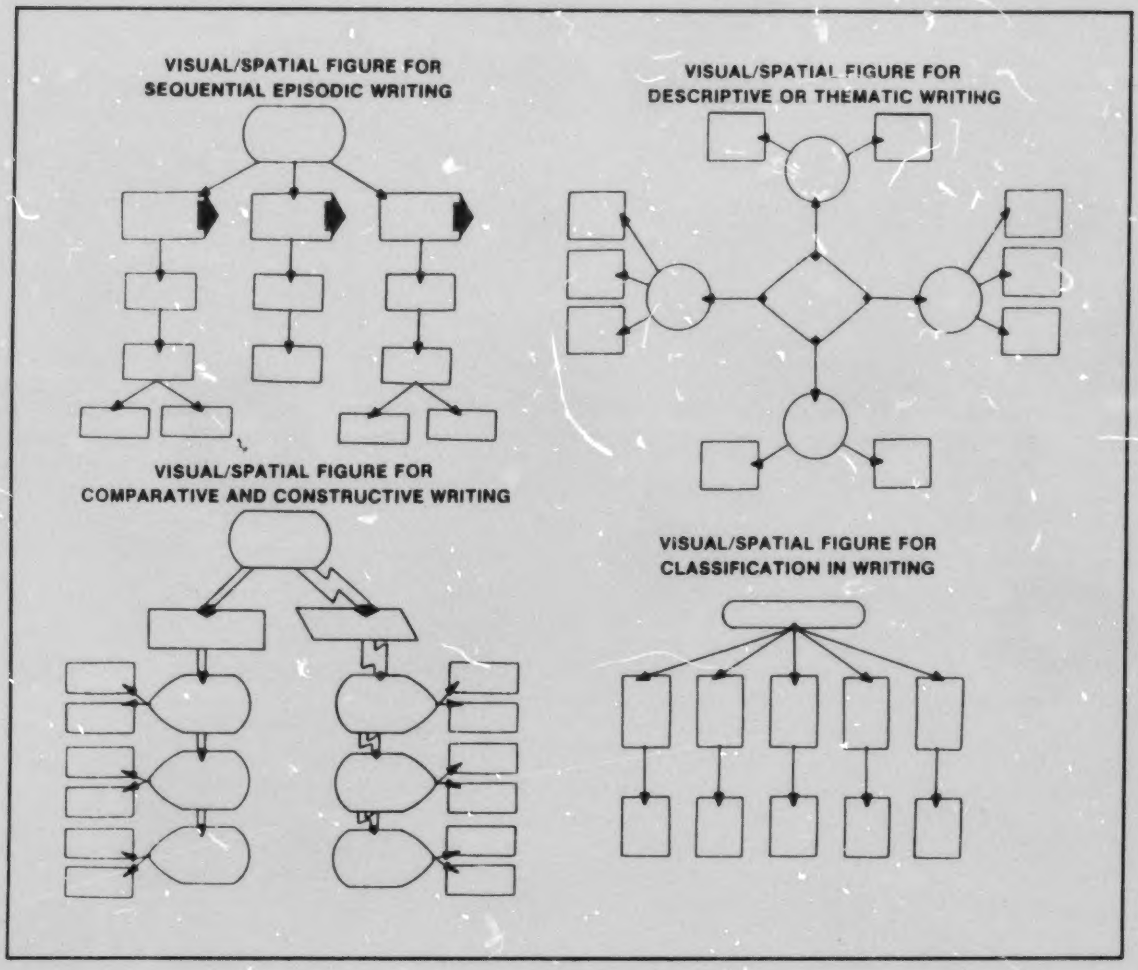
VISUAL/SPATIAL FIGURE FOR SEQUENTIAL EPISODIC WRITING
VISUAL/SPATIAL FIGURE FOR DESCRIPTIVE OR THEMATIC WRITING
VISUAL/SPATIAL FIGURE FOR COMPARATIVE AND CONSTRUCTIVE WRITING
VISUAL/SPATIAL FIGURE FOR CLASSIFICATION IN WRITING

Figure 3. Four graphic outlines of semantic maps.

Using Maps to Develop Writing Skills

A very important strategy which shows the relationship of reading comprehension with that of the organizational skills needed for writing is to show students how to develop compositions after silent reading and map construction of a selection. In this case, the reading selection serves as the stimulus for map organization and writing. Students are asked to reconstruct a selection previously read according to one of four network frameworks (see Figure 3). The reconstruction process allows for two major thought processes to occur. First, students are encouraged to remember the information presented in the textual selection in a hierarchical way and most importantly, they are asked to arrange that information in a map format that best captures the selection organization.

Initially, students may be given the appropriate map format by the teacher after each type of selection organization. However, a bit later in training of map usage, students may be asked to select the map format that they think best suits the selection organization. After selection, they are given a skeleton map format, meaning a dittoed sheet containing one of the configurations noted in Figure 3. They each, in turn, fill in the information in the empty node slots after silent reading of a selection. Once the information is arranged, they are asked to reconstruct the selection in writing according to their map format. A pay-off activity can come at a later date, when students are given a skeleton map format and asked to write their own composition based on the way they organized information on their individual map.

This procedure was followed in a study conducted over one college semester with three sections of freshmen enrolled in special classes to increase reading and writing proficiency. All 53 freshmen, 18 males and 35 females, were assigned to the special class during their first college semester upon administrative review of their high school records and Verbal SAT scores. Their average Verbal SAT score was 359 (s = 36.56) and the high school grade point average obtained on 26 of the subjects was 77.9 (s = 2.26). During the first week of the course, all subjects were administered the Nelson-Denny Reading Test (Brown, Nelson, & Denny, 1976). Their average reading score in Vocabulary was a grade equivalent of 12.29 (s = 1.71) and their average Reading Comprehension score was a grade equivalent of 10.62 (s = 2.4). A composition written on the same topical theme was also collected from all students during the first week in efforts to determine their processing level in writing prior to the introduction of the mapping technique. Their average composition score was 71.32 percent (s = 7.3) based on the average of three raters using a holistic rating scale ranging from 0 to 100 percent.

All students were introduced to the concept and procedure of semantic mapping by the same course instructor. She had students read the same selection and then showed them via use of the chalkboard how the maps could portray and organize the salient features of the content. During ensuing weeks, students were introduced to four different types of map formats; the episodic map, the thematic map, the classificatory map, and the comparative/contrastive map (see Figure 3). The map formats were constructed to serve as graphic outlines or "blueprints" to model particular styles of written discourse. The overall configuration of each map was drawn different than the other and certain nonverbal elements were added that would remind students of the type of discourse exemplified.

The general procedure was that over a period of weeks students read four assigned selections that were written in the four different styles. After silent reading, students were asked to reconstruct the content of the selection using an appropriate "skeleton" map format provided by the instructor. In the reconstruction process, students filled in the nodes with information they remembered about the content selection. During the next scheduled class period, students were then asked to write their own version of the previously read selection by using their own map as a guide. The four resultant compositions were labeled "structured" narrative, thematic, classificatory, and comparative/contrastive composition. Each composition, along with its accompanying map, was turned in to the course instructor for holistic scoring and instructor evaluation.

In a subsequent class period, students were provided with an additional skeleton map format. The task was now to write an original composition using the map outline and structure as a guide for composition development. Students filled in the nodes with their own ideas and content. They then wrote a composition based on that information and following the organizational format suggested by the map. The four resultant compositions were labeled "creative " narrative, thematic, classificatory, and comparative/contrastive compositions, and were turned in along with their accompanying maps for scoring and evaluation.

Three types of analyses were conducted on the data collected in the freshmen writing study. T-tests were used to test for significance in reading gains, analysis of variance (ANOVA) was used to determine if significant effects existed among the structured and creative writing modes, and the Pearson Correlation was used to determine if correlations existed between the instructor's rating procedure and the average holistic score assigned by three independent raters to each of the eight compositions written in the study. Results of the t-test comparing the pretest and posttest scores of the Comprehension battery of the *Nelson-Denny Reading Test* revealed a significant effect for reading comprehension ($\underline{t} = 4.82$, df = 52, $\underline{p} < .001$) with a mean grade level difference of 1.58 between pre- and posttesting for the 53 freshmen. ANOVA indicated that no significant effects existed among types of writing and that none of the four structured compositions nor any of the four creative compositions were written significantly better than the pre-study writing sample. In fact, the means for each writing type remained within three holistic points (on a scale from 0 to 100) of each other. In testing for correlations amongst the holistically scored compositions and the course instructor's agreement rating procedure, it was found that three significant correlations existed for structured writing while only one significant correlation existed for creative writing, that of the comparative/contrastive writing style.

The course instructor's agreement rating procedure ranged on a scale from 0 to 3. She evaluated each student's composition and accompanying map to the extent that the composition contained the map information and followed the organization symbolized by the map configuration (as noted in Figure 3). A "0" rating indicated, therefore, that no relationship existed between the student's use of the map and the resultant composition while a "3" rating meant that not only was all the information in the composition also contained on the map, but also that the composition was richer and fuller because the map was embellished with additional nodes and connecting links. Figure 4 shows a partial example of a map which achieved a "3" rating. Notice how the freshman writer added information-bearing nodes and connective links to show how she wanted to develop sections of her thematic topic "Teaching." Each of the nodes developed by the freshman writer was further embellished in the written composition in its proper section in the overall theme.

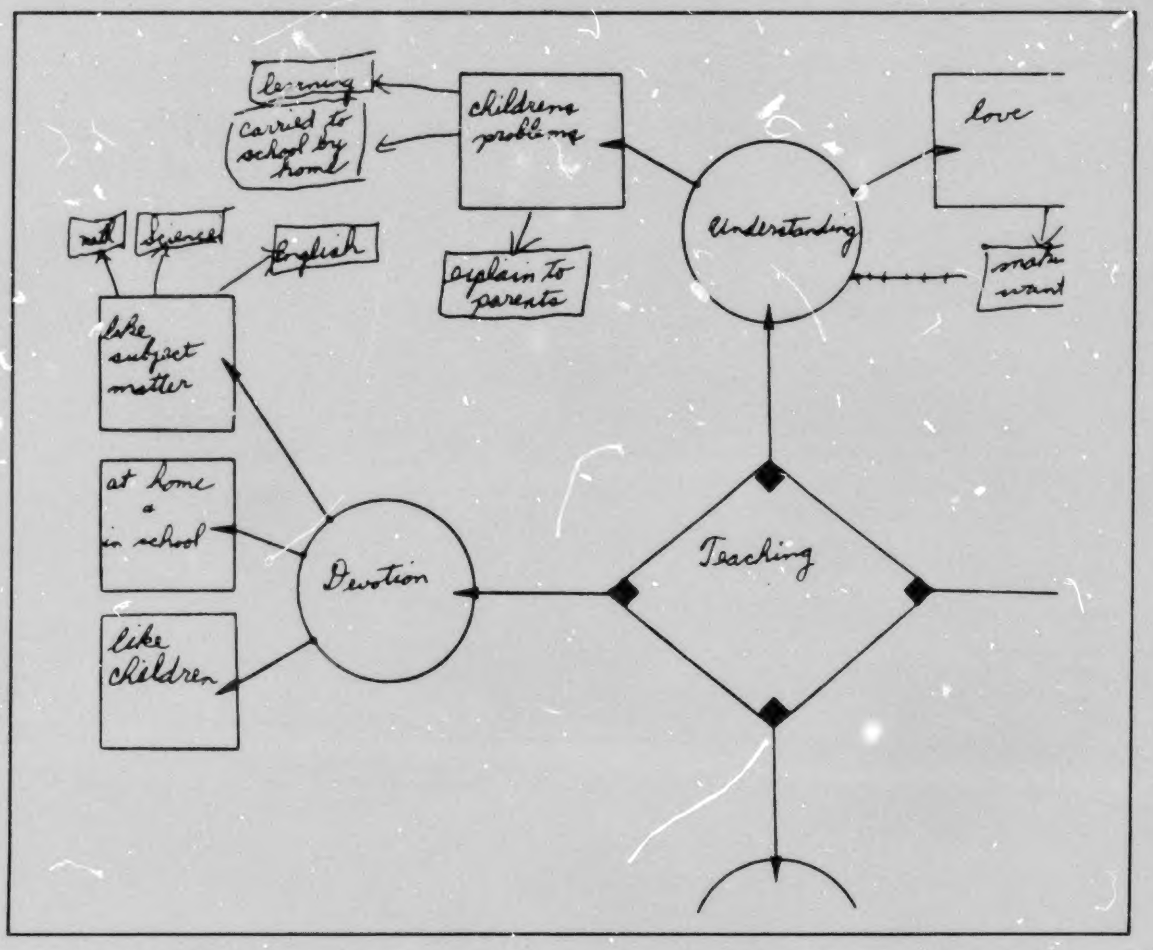
learning
carried to school by home
childrens problems
love
Understanding
math
Science
English
explain to parents
like subject matter
at home & in school
Devotion
Teaching
like children

Figure 4. Partial map construction for creative composition "Teaching," done by college freshmen.

The freshman writing study seems to reveal that while the course instructor and the three independent raters agree that as the quality of the compositions improved, the scores reflected by each composition tended to get higher. However, the holistic scores given to each written piece by the raters did not tend to fluctuate a great deal from one another and did not show any significant improvement with map usage over a composition without map usage collected prior to the study. Apparently as revealed in the two earlier studies with younger, more disabled learners, receptive understanding improves due to the mapping technique before the expressive language functioning of writing. In all three studies, reading comprehension improved as a result of the mapping strategy used either before or after silent reading of a selection. In the freshman study, however, the large gain in reading comprehension occurred when the mapping strategy was developed initially as a whole-class strategy followed by individual application of the technique. This meant that after each freshman silently read a selection, each conceptualized and restructured the organization of that content in an organizational, nonverbal "blueprint" provided by the teacher (see Figure 3 for graphic outline of each of the four blueprints). This thinking through of previously read content and arranging it conceptually in nodes and linking relationships aids the reading comprehension process. Since it is generally agreed that receptive language understanding precedes expressive language usage, more time and practice may be needed in the use of the mapping technique before it can improve writing.

## Summary

This paper has focused on just two visual/spatial techniques that may be used to improve written literacy understanding and output. Sinatra and Stahl-Gemake (1983) have presented a compelling case based on research from the neuro-sciences to show why networking, picture usage, and many other nonverbal, visuospatial representations should form the conceptual base in literacy development for many diverse learners. The use of the visual composition strategy involves students in writing and comprehending processes while achieving whole brain input in literacy development. The right hemisphere orchestrates the meaning of the overall visual theme, recalls images of viewed scenes, and visualizes the effect of adding on parts to particular scenes. The left hemisphere sequences all the separate pictures into one consolidated essay, attaches verbal labels to particular visual information, and uses language to achieve a final written product. The use of the semantic mapping strategy allows for a nonverbal configuration to represent the conceptual framework of a reading selection or an intended composition. The nonverbal visualization of that configurational schema may remain in the "mind's eye" helping the reader or writer organize and predict content as it is being read or composed. While the semantic mapping technique has aided the reading comprehension process, more work appears warranted in the use of the technique to significantly improve the writing process.

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# VISUAL THINKING AND HUMANITIES DETECTIVE WORK: AN UNDERGRADUATE COURSE FOR SECONDARY STUDENTS

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Each summer since 1980, a course in visual thinking has been offered by The University of Texas at San Antonio's Gifted and Talented Student Program for high school sophomores and juniors. Although these young people have academic records which distinguish them as bright students and strong achievers, interviews with each during the process of selecting students for the program have shown all to be verbally articulate and open to new experience but few to be visually literate. Their answers to questions intended to solicit evidence of visual thinking have made painfully clear the need for education that effectively bridges the verbal with visual modes of learning and interlaces the processes of rational with creative inquiry in the thinking of students considered best by traditional academic standards.

## Visual Inquiry in the Humanities

A major problem in attracting scholastic achievers to a course in visual thinking is that many secondary students hold conventional academic perspectives on college studies. It was necessary to find a substantive and clearly definable link between the curriculum they value and the thinking skills they need to develop. Material culture studies offer a meaningful connection for secondary students between the discipline of history which they know and an unfamiliar approach to its study that is visual inquiry. The idea of learning to become a "Sherlock Holmes" seemed to have appeal even to students who have decided to pursue high tech career goals. In the summer 1983 program, the course in visual inquiry was titled, "Stories In Things: Visual Thinking and Humanities Detective Work." It was created on the premise that imagery is essential to inquiry. Its design was based on the assumptions that: (1) visual thinking skills can be developed through the study of artifacts, (2) local history offers young people concrete and personally relevant opportunities for visual inquiry into human traces, and (3) an instructional approach which involves students with detecting clues in artifacts to puzzles about real people's lives and times will sustain student interest with sufficient intensity over five weeks to develop their perceptual acuity and sensitivity.

## Goals and Questions

Course goals which were formulated from the above stated assumptions raised some questions for investigation. Given course experiences, would students demonstrate change from pre- to posttests in:

1. the type of spontaneous questions asked in viewing an unfamiliar artifact?
2. the variety of visual elements referred to when describing an object?
3. the identification of one or more themes or a communicative purpose when describing ways to exhibit an object?
4. the types of metaphors they create?

## The Students

Seven students completed "Stories In Things" under the author's instruction. Three were high school sophomores at the time; the remaining four were juniors. Only one of the students was male. One junior came from a private high school; all others were attending public schools. Ethnic composition was mixed: three Anglo-Americans (i.e., having British ancestry), two Hispanics (Mexican-American and Puerto Rican), one Italian-American, and one Jewish-American. All were from families of middle socioeconomic status. Four were awarded financial aid. These seven students had strong records of high school achievement and had standardized achievement test scores which fell at or above the 85th percentile.

## The Course

The five-week course was designed by the author to immerse students in visual inquiry during 25 three-hour class sessions and through out-of-class assignments. Each student was given an album containing primary source materials for a San Antonio family with local roots in the 19th century. One senior family member typically was highlighted in the album which contained images of the individual's likeness and photographs and facsimiles of that person's clothing and personal belongings, house and home furnishings, tools, crafts and art-works, gravesite and tombstone, and documents such as letters, diary entries, certificates and wills, newspaper clippings--all forms of pertinent artifacts culled from family, library, and museum holdings. Items for inclusion were selected to suggest "humanities puzzles," i.e., questions for research that might help the student uncover some interesting and unsuspected piece of information about the life and/or times of the individual. Playing Humanities Detective meant uncovering human stories in things. Approaches to artifact interpretation were modeled for and practiced by students during class sessions. The great majority of those daily three-hour class meetings were held at museum galleries, historic houses, and community sites, where the students were guided through exercises to heighten their abilities to sense and form images of historic persons through visual analysis of those persons' artifacts. Kyvig and Marty's Nearby History (1982) provided readings on finding stories in human traces as did technical leaflets of the American Association for State and Local History (Newman, 1971; Schlereth, 1978; Schroeder, 1976). Museum collections proved particularly useful for developing the students' visual inquiry skills because they offered the students objects, not unlike the ones in their puzzles, for practicing the visual inquiry of humanities detective work. In addition, when those collections were on exhibit, the students became acquainted with ways to visually communicate the interpretative findings of humanities research through exhibit design. The San Antonio Museum Association's education and exhibit design staffs worked with the author to guide the students' seeing of how visual elements can be made to interact for the creation of visually interesting statements about human traces. Preble's Artforms (1978) provided background information.

In addition to imaginative written presentation of the findings uncovered by their humanities detective work, the students were expected to individually perform a dramatization of those findings at a community site which offered an historic context for the person studied. They also created visual exhibits to communicate through artifacts some facet of the experiences and/or characteristics of their subjects. The technical leaflets of the American Association for State and Local History on exhibit design proved helpful (Baker, 1981; Wilson & Medina, 1972; Welsh, 1974).

## Assessing Visual Learnings

No matter how substantive, well-organized, and apparently motivating a course of study may be, its effectiveness must be judged in terms of student learning. Because none of the students was comfortable with drawing, a verbal method of assessing their development of visual inquiry skills was needed. The instrument used for evaluation of "Stories In Things" was designed and pilot tested by Martinello and Mammen (1982). It offers a straightforward approach to gathering descriptive data on student growth in the visual thinking skills of humanities detective work.

The seven students who were enrolled in "Stories In Things" were pretested in March 1983 and posttested on completing the course in July of the same year. The following questions were applied to the pre-Columbian drummer shown in Figure 1 on both the pretest and posttest 1:

1. What questions would you like to ask about this subject?

2. What words would you use to describe this object?

3. How would you display this object?

4. Complete this phrase: This object is like. . .

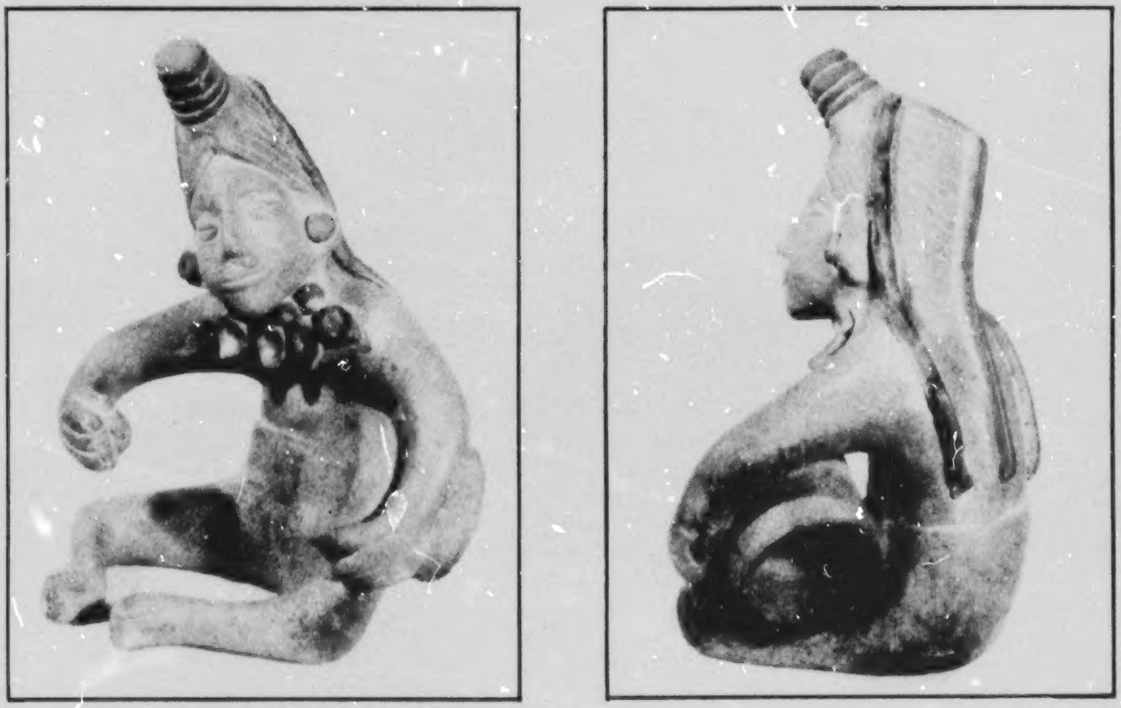

Figure 1. Pre-Columbian artifact to which questions were applied in pretest and posttest 1. (Photographs by Thomas H. Robinson.)

A second posttest applied the same questions to the cloth sugar sack shown in Figure 2.

The first item seeks to determine what types of questions students asked about an object: factual or interpretive. Factual questions are usually concerned with the object's origins, age, and function. These questions seek one correct answer. By contrast, interpretive questions entertain more divergent responses and often involve imagery on the part of the students as they interact with the object. Such questions include references to the object's meaning for the maker, user, and viewer.

The second item attempts to assess the number of visual elements the student responds to when viewing an object. All descriptors supplied by the respondent were coded for reference to any of the nine visual elements defined by Preble (1978): line, shape, color, mass, space, texture, time, and motion. The number of those nine elements referred to by the descriptors was recorded; each element counted only once no matter how many descriptors were listed which refer to it. Also noted was the number of feeling words used and the number of other descriptors listed.

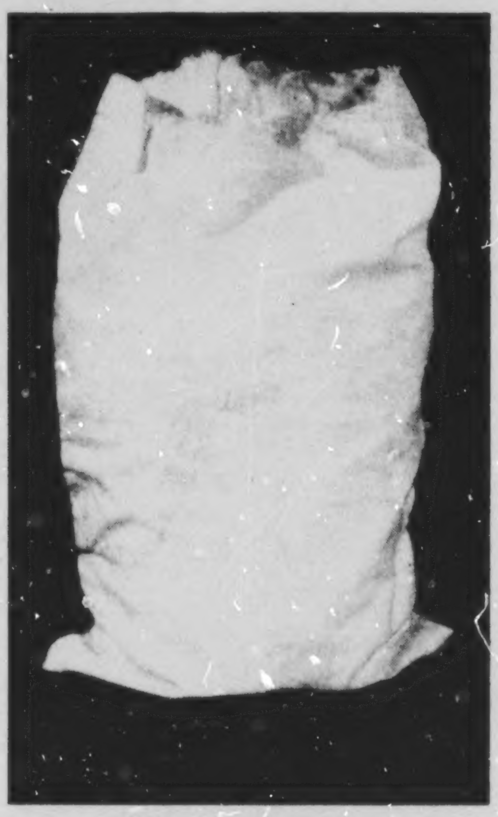

Figure 2. Sugar sack artifact to which questions were applied in posttest 2. (Photograph by Thomas H. Robinson.)

The third item about exhibiting the object is intended to determine whether the student refers to one or more themes for an object's exhibition. Student responses to this question also are scored for reference to: (1) the use of additional artifacts to complement the given object, (2) a specific site or location, and (3) other provisions for an exhibit such as lighting, background, and sound.

The last question asks for completion of a simple metaphor: This object is like. . . . Responses were coded for reference to concrete or abstract imagery.

## The Findings

Given the obvious limitations of sample size for statistical analysis, the comparison of pre- and posttest data is offered in descriptive terms only. The findings are suggestive of certain types of learning developed by the course and of some promising directions for instrument development.

All codings reported here were based on category definitions established during the instrument's pilot test. The author's classification of both pre- and posttests controls for continuity of the codes assigned. The two posttests are numbered to correspond to the objects each used: Posttest 1 applies to Figure 1; Posttest 2 applies to Figure 2.

Item 1: Questions. Table 1 shows that better than 80 percent of all questions asked on pre- and posttests were fact seeking. This question type was most prevalent whether students were addressing the sugar sack, which had been an object of study during the course, or the pre-Columbian drummer, which had not. In self-assessments of their question-asking tendencies, the students reasoned that their lack of knowledge about a subject prevented them from knowing what questions to ask. Nonetheless, neither the number nor type of questions they addressed to the sugar sack was indicative of their experience with that artifact during their course studies.

Table 1

Frequencies and Percentages of Pre- and Posttest Response Categories for Items 1 and 2

| | Pretest | | Posttest 1 | | Posttest 2 | |
|---|---|---|---|---|---|---|
| Items | f | % | f | % | f | % |
| 1. Questions | | | | | | |
| Fact Seeking | 33 | 80.5 | 36 | 83.7 | 29 | 87.9 |
| Interpretive | 8 | 19.5 | 7 | 16.3 | 4 | 12.1 |
| 2. Descriptors | | | | | | |
| Visual Elements | 1 | 3.9 | 6 | 16.7 | 10 | 41.7 |
| Feelings | 3 | 11.5 | 9 | 25.0 | -- | -- |
| Other | 22 | 84.6 | 21 | 58.3 | 14 | 58.3 |

Item 2: Descriptors. Reference to visual elements in describing the pre-Columbian drummer during the pretest was limited to one element identified by only one student. Table 1 shows that visual elements accounted for 3.9 percent of the descriptors on the pretest. On posttest 1, the percentage had risen to 16.7; on posttest 2 it increased further to 41.7. Indeed, the raw data show that in contrast to the unique event of a reference to one visual element which occurred on the pretest, on posttest 2 every student but one referred to at least one visual element in describing the object given. The sole student who had made reference to one visual element on the pretest recorded three on posttest 2. These findings suggest that the students' awareness of how to recenter their perceptions of an object by using the visual elements studied during the course had

been increased. They were more facile in using the visual elements for recentering on the object they had experienced in the context of course studies, although that object had not been used for student practice in applying visual elements or in recentering attention. It is interesting to note that while there was an increase in student use of feeling descriptors from 11.5 percent on the pretest to 25.0 percent on the posttest in response to the pre-Columbian drummer, no feeling descriptors were applied to the sugar sack. Perhaps students were responding to the human characteristics of the pre-Columbian drummer. Supporting this interpretation is the relatively large number of descriptors classified as "other" which refer to personal characteristics of the figure. The sugar sack was most often described by its function.

Item 3: Exhibit. This question about how the given object might be exhibited yielded the three most interesting findings. Table 2 presents the number of students who cited the following in their pre- and posttest responses to this item; (1) themes or purposes, (2) the use of other artifacts, (3) location and (4) components of exhibit design such as lighting, sound, background and other elements. On the pretest, only two students assigned a theme to the exhibit of the pre-Columbian drummer. On the posttest, that same artifact was assigned a theme for its exhibition by five students. All seven students described a thematic exhibit for the sugar sack and each offered a unique idea. Use of other artifacts in an exhibit of the given object was cited by three students on the posttest. All seven referred to using a variety of artifacts to complement the given object in response to question 3 on both posttests. This apparent shift toward use of additional artifacts by all students after completion of the course can be contrasted with their shift away from naming a specific location for exhibit of the given object. On the pretest all seven students made explicit reference to a particular location for exhibiting the pre-Columbian figure. Four students named a site for the object's exhibition on the posttest. None did so when describing an exhibit of the sugar sack. Reference to other exhibit elements was variable across tests. These data suggest that the students were more likely to think in terms of thematic contexts or communicative purposes of exhibits after completing "Stories In Things" than they had been before taking the course. The reduction in their references to an exhibit site combine with their increasing emphasis on the use of artifacts to complement a given object in order to communicate a central idea or concept through visual displays is evidence that the students were learning to see objects in their historical-cultural contexts and learning to communicate central ideas by displaying objects in those contexts.

Item 4: Metaphors. The students had difficulty writing metaphors on pre- and posttests. The great majority of their attempts to find likenesses for the objects resulted in concrete representations. There was virtually no change from pre- and posttest in the type and frequency of their metaphors which, for the most part, were unimaginative.

Table 2

Number of Students In Each Response Category for Item 3 on Pre- and Posttests (n = 7)

| Response Category for Item 3 | Number of Students<br>Pretest | <br>Posttest 1 | <br>Posttest 2 |
|---|---|---|---|
| Theme | 2 | 5 | 7 |
| Use of Other Artifacts | 3 | 7 | 7 |
| Specific Site | 7 | 4 | -- |
| Other Elements of Exhibit Design | 2 | 4 | 2 |

## The Course and its Test

Given the sample size of seven students, this report may be viewed as a limited case study. Nonetheless, its findings are suggestive of directions for curriculum development which promotes student growth in visual inquiry through humanities studies and ways of assessing the relevant skills of visual thinking and graphic communication for the non-artist.

The instructor's informal observations of the students' inquiring behaviors tend to confirm test findings. The students were not comfortable with interpretive question-asking. They had been working hard to acquire tools for seeing more fully during the summer term. In using visual elements to recenter their viewpoints on an artifact, the students were enlarging their perceptions. To expect them at the same time to also formulate probing questions from those enlarged perceptions proved to be unrealistic.

The students of the Summer 1983 program needed more explicit guidance and practice in using the processes of visual inquiry than they received. The same may be said for developing their facility in the use of metaphoric language. Accordingly, new humanities puzzles are being developed for class learning activities. Visuals for them are selected and sequenced for exercises in guided inquiry and the translation of images into words.

From pre- to posttest, students appeared to make gains in learning how to communicate historical-cultural meanings through objects. The clear increase from three students on the pretest to all seven on the posttest who noted a theme for exhibiting an object and who specified the use of additional artifacts to provide context clues for the viewer's understanding of the focal artifact suggests that the students had increased their awareness of the clues to human stories in things. They also seemed to be learning how to prompt clue detection in the viewer. Designing and actually constructing small exhibits on subjects drawn from the humanities puzzles caused students to deal with problems of graphic communication. The assignment provided a focus for inquiry and a tangible way to integrate education in visual thinking with the social studies.

The set of questions used for course evaluation seems to hold promise for assessing student growths in selected aspects of visual thinking. The test is easy to administer and score. Developmental work is planned for the instrument. Larger response samples are needed from persons of varied ages and backgrounds in the visual arts and in visual inquiry. The reliability of response codings must be subjected to scrutiny using several judges. The categories of codes may need revision as larger samples of data offer new directions for response interpretation and, perhaps, new test questions or tasks.

## New "Stories In Things"

"Stories In Things" for Summer 1984 will focus on the lives of women in the American West. Students will be helped to use visual inquiry in detecting life experiences of particular pioneer women who have left us some of their human traces to ponder. Pre- and posttest evaluation will be conducted with a revised test base on the form described in this report. In addition to the enrollment of new students, some of the seven students from the summer 1983 course will enroll in the 1984 version of "Stories In Things." Case studies of these students' growth in visual thinking should be particularly meaningful because they will be starting from an experiential and developmental base in visual learning which is considerably higher than the author has found in most applicants for the course. A major purpose in documenting the visual learnings of experienced and inexperienced students who take the course will be to determine the extent and limits of integrating education in visual thinking with humanities studies. The evidence collected may strengthen the rationale and offer methods for visual education in the social studies curriculum.

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# A WHOLE BRAIN APPROACH TO CREATIVE PROBLEM SOLVING

by
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The title is the subject of an intensive two-day seminar for managers offered for the past three years at the Management Institute, University of Wisconsin-Extension, Madison. The program is designed to enhance management skills by practical application of the findings of brain/mind research to problem solving activities in management situations.

The key segments of the program include:

1. Learning how the brain functions
    a. the brain as a bio-chemical organ
    b. brain functioning in learning, problem solving, emotions, perception, communication and memory
2. Concepts of hemispheric dominance and integration
    a. implications from the research
    b. using more of your mental potential/two modes of learning
3. Feedback instrumentation and hemispheric shifting
    a. tests on hemispheric dominance, scoring/feedback
    b. series of exercises requiring shift from one hemispheric dominance to the other
4. Visualization
    a. mental images and their intellectual status
    b. importance of imagination/imagineering
    c. techniques/exercises
5. Applications
    a. creativity/creative problem solving
    b. super learning

c. relaxation/meditation/biofeedback/self-hypnosis

d. memory

e. communicating styles/survey instrument/feedback

All of the segments are presented in varied formats. Slides, overheads, films, visual manipulation problems, diagramming, case studies, and feedback exercises complement the lecture material throughout the seminar. An extensive workbook provides references, reprints, and exercises for the participants to use during and after the seminar.

The participants in the seminar are upper level managers who are in positions that require solving problems, new idea generation, creative efforts, or largely mental activity. The objective of the seminar is to help the participants expand their abilities. Each participant receives a (different) current article relating to the topic a week before class. These are briefly shared and discussed during the seminar as an introduction to the topic. The messages emerging from the findings of the research discussed in these articles help to:

1. define and illustrate concepts of lateralization

2. clarify the uniqueness of each human brain

3. comment on the general discrimination modern society and our educational systems show against half of the brain

4. demonstrate that a hemispheric bias can be altered

5. illustrate numerous applications of "ambidextrous thinking"

The major segments of the seminar are presented in verbal, visual, and experiential form. The seminar leaders include a psychologist with a specialty in behavioral science instruction for management complemented by business consulting and training; a psychologist specializing in visualization, hypnosis, and mediation relating to wellness and the prevention of occupational burnout; and a visual design consultant involved in teaching about visual learning, perception, and the creative process.

The approach is a "whole brain/whole body" one, emphasizing the art and practice of self-regulation. Participants become aware of the extent to which they are already programmed or biased. A variety of testing instruments and demonstrations are used, with self-scoring and interpretation. This provides some motivation for increasing flexibility and choice in styles of thinking, visualizing, and communicating. The introduction to brain functioning establishes a base of information for the exploration of hemispheric integration and increased potential for self programming in approaching problem solving in both personal and management situations.

## VISUALIZATION

One goal is the development of the capacity to switch back and forth between different modes of mental functioning as needed (i.e., ambidextrous thinking). Although we live in a visual culture, our educational system generally emphasizes linear thinking and abstraction, while considering imagery a distraction. With the exception of some visually oriented fields, the tendency is toward the elimination of visual thinking. In reality visualization demands conceptual activity of a high order and increases mental ability. Minds can be exercised in visualization, and these increased skills can enhance memory, learning, flexibility in using non-linear thinking, capacity for creativeness, and creative problem solving.

The "practice" ranges from the private pictures created while led through exercises by a psychologist, to a series of design and drawing tasks led by a designer. The exercises set aside seeing things in terms of words, and demand different ways of perceiving and recording those perceptions. The ability to shift from verbal processing to spatial processing is practiced. Developing new ways of seeing by tapping the special abilities attributed to the right hemisphere frees up those who are biased on the left. The use of both hemispheres, with communication between the two hemispheres, is essential if our creative efforts are to be well integrated. This applies as well to the synthesis that brings a whole symphony of talents to problem solving of all kinds.

## PROBLEM SOLVING

Perhaps the most common problem in management is the lack of realization that others have different mental functioning and communicating styles. People who work together without recognizing this usually have friction with each other. The approach of non-imagers favors analysis and dissection, while the visualizers lean towards synthesis and invention. One goal is to understand differing styles and be able to switch when good communication necessitates flexibility. There is great value to having people with different mental styles in a group. Helping them experience the potential that can be tapped by switching from one mental strategy to another aids in combining synthesis, analysis, and integrating skills.

## CREATIVITY

Creativity researchers have long studied persons identified as creative, examined the concepts of creativity, and considered the creative process. A basic assumption held by many researchers is that creativity requires "both brains" working together. . .a whole brained cooperation. Many creative thinkers describe their personal code of creative thought as "illuminations" during which ideas emerge unverbalized, complete, in primarily visual-spatial form. This illumination is only one part of the creative process. The various steps described by researchers most often include the following:

1. interest, orientation (WB)
2. preparation, analysis (LB)
3. incubation (RB)
4. illumination (RB)
5. verification, evaluation (LB)
6. application, exploitation (WB)

The steps involve the use of the whole brain, while some segments focus on skills attributed to right or left brain. This use of not only the intuitive right hemisphere but the analytical left hemisphere allows for the interplay of both hemispheres necessary to applied creative thinking. This suggests that all modes of brain functioning need to be educated, with an emphasis on integration.

## CONCLUSION

All of these considerations provide the rationale for the whole brain seminar. New understandings of mental functioning, with experience in methods to expand that potential, provide tactics for managers to use a whole brain approach to creative problem solving.

# HUMOR AND VISUAL LITERACY: KEYS TO EFFECTIVE LEARNING

by
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## Use of Humor in the Curriculum

Although field-based educational research involving the use of humor is still in its infancy, the efficacy of incorporating humor into the reading/language arts curriculum is supportable. The utilization of humor is encouraged for both affective and cognitive reasons.

First, consider some of the possible affective benefits:

a) The use of humor during instruction can help foster a positive and enjoyable classroom climate (Brumbaugh, 1940).

b) Teachers can assist in enhancing student involvement by using humorous activities.

c) Using humor in the classroom helps students develop a more positive attitude toward school, the teacher, and the subject area (McCormack, 1979).

d) Activities that allow students to creatively use their own humor can enhance students' self-concepts.

The problem, at present, is that so little research has been conducted in educational field-based settings that most affective rationales for humor are still based somewhat on belief (that is, "what sounds logical") rather than on data-based attitudinal research. Several individuals are researching the affective values of curricular humor, but highly specific and definitive results are not yet available. However, it has been quite well established that most students do indeed have a sense of humor (i.e., McGhee, 1976) and that students respond well to humor that is challenging (McGhee, 1976).

There are also many cognitive considerations for utilizing humor in the curriculum:

a) Humor can be a motivational tool to develop students' creative capacities (Treadwell, 1970).

b) Humor can assist in teaching students language arts skills.

c) Humorous activities can be easily adapted for students performing at various achievement levels.

d) Humor is consistent with Piaget's stages of development (Athey, 1977; McGhee, 1976).

e) Humor is consistent with information processing theory. If material presented to a student is to be learned, it must be efficiently stored and retrieved. Information must also be made meaningful and relevant to past experiences (Neisser, 1967; Morris, 1977; Ausubel & Robinson, 1969; Ausubel, Novak & Hanesian, 1978; Berlyne, 1961). Humor is an excellent vehicle for creating these conditions for information processing and meaningful verbal learning (Colwell & Wigle, 1984).

## Rationale for Using Humor and Visualization

The previous literature review reveals that the use of humor can enhance both cognitive and affective dimensions of learning and memory. Investigators in the field of visual literacy have similarly documented increased student gains in both cognitive and affective dimensions. Canelos (1980), Hadamard (1945), Whorf (1976), Paivio (1975), Hilgard and Bower (1975) and Collins and Quillian (1972) have discussed findings related to mnemonic and image memory inquiry. Media presentations allow students to store information both verbally and visually, and the injection of humor encourages students to follow the presentation more closely and process the information more effectively.

These points suggest that combining the two techniques can have a positive impact on student learning in the classroom. Through the use of humorous pictures, slides, filmstrips, movies and cartoons, student learning of important concepts and facts is potentially increased and retained for longer periods of time.

Both students and teachers can actively participate in sharing a humorous visualization experience. When listeners hear funny stories they naturally form images in their minds as they hear the story. The better listeners are at understanding and visualizing the situations, characters, plot, and ending, the more likely they are to enjoy, remember, and appreciate the funny story. Images can be very powerful tools. We look upon visual literacy as a languaging process that involves being able to read external visual stimuli, translate verbal information into visual messages, and form internal images of one's own making.

Often people finding themselves in serious or somber situations create images that cause them to find something amusing in that situation. Everyone thinks in terms of images. People think of mental images to solve problems, escape from the external world, and remember experiences. In a like manner, teachers can use training and knowledge about visual literacy to help students express themselves through media in a humorous way.

We believe that images and humor in the classroom can often change the way students feel about school, certain situations, learning, and behavior. Some students are better at imagery than others and, of course, some students are better at humor than others. Two suggestions that we would make are to (1) have students practice imagery in a relaxed state and (2) work together in pairs or groups. As students begin to develop skills in visual literacy, they will find that humor is an ideal subject to use. The skills developed in the combination of visual literacy and humor include:

1. learning how to see critically
2. learning how to communicate visually
3. learning how to control imagery for positive purposes
4. learning how to use free-flowing imagery for fun
5. learning how to use humor as a coping strategy in our world.

Imagery and humor are simple ways to release tension, gain new perspectives, and enjoy and enrich our lives.

Applications of Humor and Media in the Classroom

There are numerous examples of applications of humor in the classroom. Many start with the premise that humor can be presented more extensively in reading/language arts classes than in some other subject areas. Rowell and Goodkind (1982) were among the first to present a reading methods textbook that enumerates humorous strategies to teach a diverse assortment of language arts skills. A collection of readings on reading instruction by Thomas and Loring (1983) also delineates humorous activities for language arts classes. Similarly, there are journal articles in which specific strategies are suggested (i.e., Colwell, 1981).

The authors of this manuscript are suggesting activities that specifically combine humor and the use of media. Examples of these types of activities would include:

a) Slides. Visually-sequenced humorous stories (student and teacher generated).

b) Storyboards and scripts. These are typically student developed for humorous television and slide/tape programs.

c) Student-drawn cartoons. These can be done on overhead transparencies, flip charts, or be made into laminated books.

d) *Teacher-developed humorous graphics* to underscore key instructional points.

e) Producing *humorous student-generated audiotapes*.

All of the humorous activities suggested are relevant to instructional goals and objectives. It must be clear, especially in these times of "back to basics," that humor in and of itself is not the primary goal. The most salient point is that humor can make the presentation of instructional material more palatable to the students and, for reasons discussed previously, can provide keys for storing and retrieving information.

## *Future Directions for Research*

While researchers have studied the impact of humor and visual literacy separately, they have failed to combine the two areas during inquiry. The effect of humorous media on student learning and attitude in the classroom is an area in need of investigation. The following include suggestions for future research combining the techniques of humor and media in the schools.

*Humorous media in the classroom*. The impact of humor presented through media in the classroom must be explored in relation to students' attention to the task.

Further, investigators may wish to examine differences in students' attitudes toward various types of humor and media across grade levels in order to determine the types of humor and media that are most effective at various stages of development. Differences between the sexes in relation to the above may also be of interest.

*Teacher-generated humorous media*. Examination of the impact of humorous media developed by the teacher for the purpose of reinforcing or presenting important concepts can be studied to determine when the use of humorous media has the greatest impact on student learning, student involvement, and attitude toward the lesson. Humorous examples presented at different times during a lesson (e.g., introduction, main lesson, summary, and evaluation) can be compared to answer the following questions: Do humorous examples presented during the introduction of the lesson activate student involvement such that they are more attentive during the remainder of the lesson? Do students retain information when it is presented through humorous examples better than students who receive examples that are serious? Does students' time on task increase as a result of the inclusion of humorous media in a lesson? If so, does it continue during the more serious dissemination of information? Do students have a better attitude toward the lesson when humorous media are used as compared to students involved in the same lesson without humor and/or media?

Student-generated humorous media. The impact of student-generated media in relationship to meaningful classroom instruction is another area in need of examination. Investigators can examine student productions of humorous media in relation to their cognitive, affective, and creative functionings. Researchers may wish to examine the impact of humorous media production designed to synthesize information presented in class. Questions that may be answered are whether students synthesize information more effectively when they are asked to produce humorous media examples related to meaningful concepts? At what grade level do these types of activities have the greatest impact? Does the humor and/or media production have greater effects on attitude, creativity, and learning than activities of similar nature that are more serious and include no media production?

## Conclusion

In conclusion, the research questions presented above are but a few of the unanswered questions related to the integration of humor and media in the classroom. A combination of these techniques can have intriguing implications for the classroom. With greater use of media and humor in the classroom, schools can potentially become more exciting. Students can feel more inclined to increase their attention to the task, which can result in the most important goal of schooling: an increase in student learning.

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# DRAWING ON THE RIGHT BRAIN WITH STUDENTS: AN APPLICATION REPORT

by
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I. Introduction: In the Spring of 1983, the course Visual Literacy, 17.202 was taught for the second time. Fifty-seven students took the course. All but one were declared majors in Visual Media or Cinema Studies in the School of Communication or Department of Literature at The American University. (Description of this course and its curricular context can be found in "Preparing a Required College Course: Visual Literacy," Readings from the 13th Annual Conference of the IVLA, November, 1982; "Preparing a Required College Course: Visual Literacy" in Visual Literacy Newsletter, May 1982, Vol. 11, No. 4, published for IVLA by Indiana University Audio-Visual Center.)

II. Syllabus and Description of the Course: A two-page syllabus was prepared for this large group instruction course with a limit of 100 students, the maximum number of seats in Wechsler Theater.

Responding to Spring, 1982 evaluations, the course began with instruction in reading the moving image and sound. Betty Edward's book, Drawing on the Right Side of the Brain, was tied into the second unit on the science of seeing and drawing. Other units on design, painting, sculpture, architecture, and photography followed. The course concluded with a look at the avant garde, new technology, future projections, and the presentation of class projects including drawings.

Similar to 1982, each student was asked for a picture of themselves to be mounted on a display board designed to help class and professor get better acquainted. Each student was asked in 1983 to create a personal logo (Figure 1) that eventually was displayed and also used on papers, reports, and tests as a signifier instead of traditional names.

A Creative Project requirement replaced the 10 page term paper and represented 25 percent of the grade. Creative Project Groups were designed to help students toward developing a creative final project. Professor Bonnie Willette, an artist on staff at the University, lectured on creative activity and projects drawn from within oneself. Project groups were formed in slide tapes, animation (16mm and Super 8mm), storyboarding, creative planning, and drawing. The latter was described in the following way:

1. Drawing--Using Betty Edward's book Drawing on the Right Side of the Brain. One group session needed at

first and lots of the work can be done individually. Professor Sutton will lead.

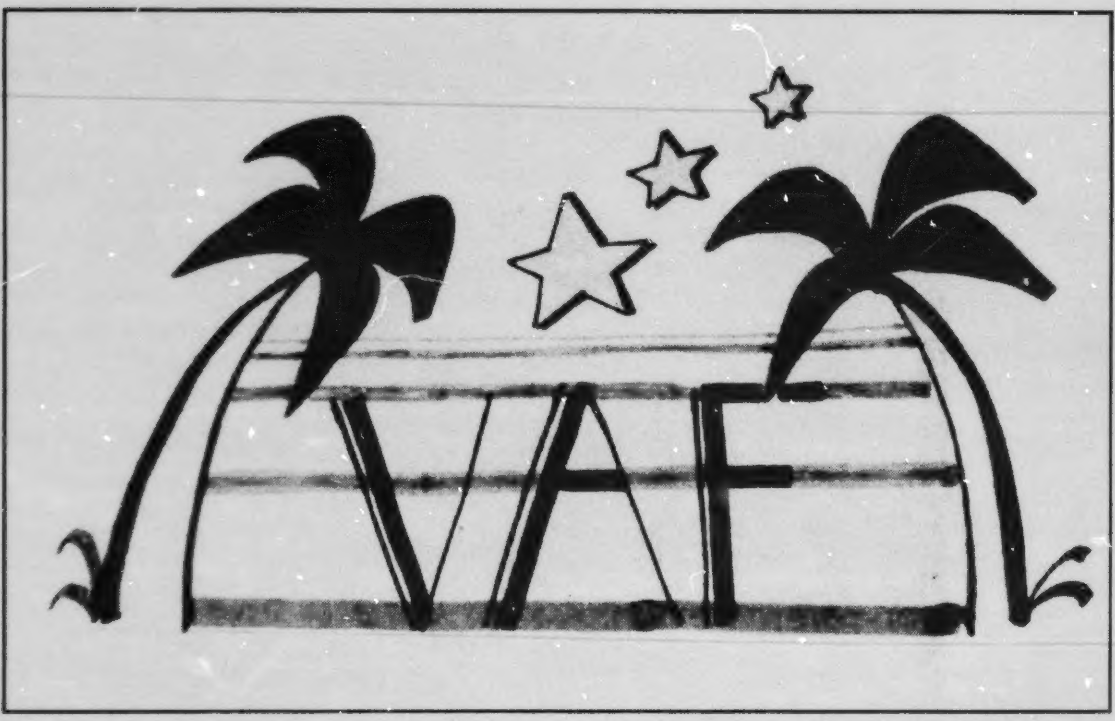

Figure 1. Example of student logo.

Twelve students responded and sessions of orientation, feedback, and mutually supportive show-and-tell were held one each in February, March, and April. The final results were shared with the whole class briefly via an opaque projector.

The sessions were informal and the professor worked on the assignments with the 12 students. At the initial meeting we all shared our pre-instruction drawings (a person without looking at the person; person's head--self or other; our own hand; a chair), confirming what most of us knew, we couldn't draw!!! Lots of laughter. Lots of anxiety.

We met again in March and had moved through the upside down drawing of Stravinsky (ch. 4), etc. Some of us had breakthroughs here. We were amazed and skepticism turned to tentative belief. We then shared childhood drawings (ch. 5) and grew closer as a group. We also fell out of synch about here. A few collapsed and produced only sporadically from here on to the end, but others streaked ahead moving rapidly through Meeting Edges and Contours (ch. 6). Some significant breakthroughs happened to the front runners here and there was now no stopping them.

Negative Space (ch. 7) was the key theme of the group meeting in late March and early April. This is as far as a few more got (including the professor) but the leaders and completers pushed on through perspective (ch. 8), tore into Proportion (ch. 9), glided into Portraiture (ch. 10), and came to a pleasant, self-confident stop with Seeing Light and Drawing Shade (ch. 11). Figure 2 depicts sample student drawings before and after instruction. The last session was a mixture of shy, modest triumphs and quiet envy from the quitters. But all of us knew one thing for sure. We could draw on our right brains. A myth about ourselves--not being able to draw--had died. For some it perished in a blaze of self-fulfilling practice and for others in equally self-satisfied, more modestly demonstrated theory.

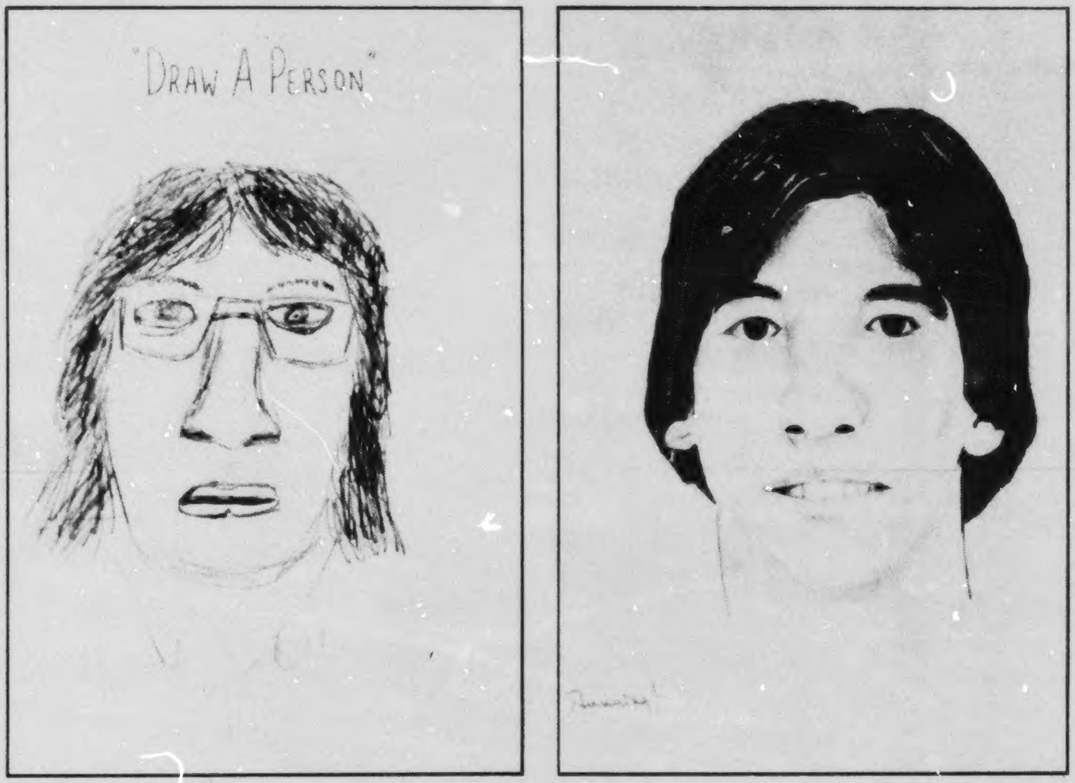

Figure 2. Drawings by Jim Lutz (before and after instruction).

Conclusion: In conclusion, I have decided to plunge the entire class into the process in the Spring of 1984. The Edward's book and its 12 chapters will be required of all students during the 15 week course. The creative project for all will be the basic required and optional drawings. Other creative activities, such as slide tapes and films will be on top of this requirement. I am substituting the Edward's book for the Dondis book on visual design which will move to a recommended status. It will continue to provide information for lecture-presentations as well as student exercises on design and visual literacy. I also have had to replace Bates Lowry's *The Visual Experience*, which went out of print, with Taylor's *Learning to Look*.

One question presents itself. Will the required nature of the drawing work harm the experience? I don't know at present. I will have a graduate assistant with a background in art and art history working with me. I'm hoping this will help. I'm hoping the contagious breakthroughs will sweep even the reluctant ones along. I have plans to copy work in progress and share high moments with the class as a whole.

Other than these small changes and this big plunge into the arms of Betty Edwards, the course will remain basically the same. Work will be done by myself and the graduate assistant to develop each lecture into a solid and meaningful and interesting presentation with properly prepared and timed audiovisual aids. I have plans for a book on the course after this third time teaching it. If anyone knows any interested publishers, let me know!!!

# TELEVISION NEWS: ANALYSIS OF VISUALS

by

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The "news" section of my course in "Television Criticism" comprises the last third of the semester. The primary concerns of the course at this point are with the following: 1) news is not a neutral product, never simply a series of "facts" or a "mirror of reality," but produced from within specific interpretative frameworks; 2) news is a cultural artifact or discourse, sequences of "socially manufactured messages":

> From the accents of the newscasters to the vocabulary of camera angles; from who gets on and what questions they are asked, via selection of stories to presentation of bulletins, the news is a highly mediated product (Glasgow University Media Group, More Bad News, 1980, p. 398);

3) ". . . the transparency of the television screen is an illusion" (Stuart Hall, "Television and Culture," p. 247.); 4) news professionals incorrectly assume that their activities are dictated by events that happen that day (cf. Gaye Tuchmann's Making News and David Altheide's Creating Reality); 5) news contains implicit "world views" which prestructure what the news is and how it is to be produced/manufactured/framed; these "world views" embody a "specific way of understanding the world" and the news itself; 6) such notions of news and newsworthiness as "significant," "relevant," "interesting," "neutral," and "objective" are problematic; 7) the tripartite division of the research tradition--the sociology of broadcasting institutions and individuals, content analysis, and the sociology of audience ("effects") response is often fragmentary and inconclusive, but nonetheless not to be ignored.

In short, the use of sound (i.e., language viewed as "news-talk") and image (i.e., the language of visual structuring of events into "stories") is the expression of news professionals' codes and conventions and needs to be understood in relation to those codes and conventions as well as understood in relation to those (i.e., the audience) who receive those ("meaningful") messages called "news." Sociologically-oriented content analysis of the visualization of news is not without methodological shortcomings (Adams & Schreibman, 1978); content analysis often pays no attention to news visuals, focusing instead upon the verbal text, usually a transcript of the verbal portion of the news. Therefore, a valid coding scheme for a viewer's understanding of both the visual and the auditory aspects of news must be devised, and it must include the rules governing the production and the analysis of news-film.

Then, the students return to the detailed description of one night's news on one local station, usually taken from a different week's videotapes for another, different analysis of one story. The example chosen for the presentation, the fifth story of the evening on "Laid Off Workers," will be shown and then analyzed: first a "viewing" of the entire story, bearing in mind that: that is to take the story out of its place in the "flow" of the news on that night; that is to isolate it from its "habitual" place in the general "flow" of television viewing for an individual (or group); that is to remove it from its appropriate viewing context; and that is, because the description and the detailed analysis of the "voices and faces" are written, verbal accounts of what is experienced as an audio and visual phenomenon,--that that is to distort the very process of analysis itself.

The analysis of the "Laid Off Workers" story would--since I do not hope to get through all of the levels of analysis, hypothesis assertion and testing, and levels of understanding relevant to a full discussion of this story--handle several of the following considerations:

1) the nature and function of the audio-text as "news-talk."

2) the nature and function of the video-text.

3) the interaction of audio-and video-text; reinforce/conflict with each other; how each "channel"is handled in our understanding; the "chaining of signifiers."

4) the number of different shot changes in the story (there are 20), the length of time of each shot, the length of time of the story itself vis-a-vis other stories including matters of packaging, pace, and rhythm as assumptions about audience (i.e., one with a short attention span, low socio-political interests, unlearned in visual techniques and a "family").

5) the probable "preferred readings" (following David Morley's distinctions between encoding and decoding messages in The Nationwide Audience through a dimensionalized notion of levels of understanding in a potential audience, including:

   a) the unemployed/employed
   b) Buffalo resident/non-Buffalo resident
   c) relative (friend, etc.) of unemployed/non-relative (etc.)
   d) socio-economic attitude toward unemployed/no attitude
   e) "uses and gratifications" concepts of "active" audience

I think it is fair to suggest that only in the recent Glasgow University Media Group's second volume, *More Bad News* (1980), has there been any consistent attempt to uncover those rules governing the visual presentation of news. That attempt is flawed by their insisting upon the "shot as the basic unit--the visual equivalent of the lexeme." Their concern is with: how does the flow of visual presentation proceed? What are the rules for opening and ending programs? How are news presenters themselves presented? How are correspondents and reporters shown to the viewer? What visual rules govern interviewing? To what extent do the normative rules of film-editing apply? In the absence of formal professional guidelines, they attempt to "deduce what ground rules appear to be operating."

All of the activities in the "news" section of the "Television Criticism" course work through a variety of strategies to demonstrate that: 1) news relies upon and attempts to build trust, believability, credibility, viewability, truth, neutrality, impartiality, and objectivity; 2) news attempts to disguise the process of selecting, framing, structuring, "clustering of stories," contextualizations, predilections for particular frames of reference, and cultural neutrality; 3) news presentations are designed to maintain and sustain the legitimacy of anchors, reporters, etc., the manner and format of the presentation (i.e., the same set, same people, same "musical" logo, etc.), and the "flow" of general television sequencing; 4) news is an effort to convince the audience that what is being seen and heard is the "event" itself (the familiar film ideas of the "fallacy of the camera," the "fallacy of the omniscient observer," and the "fallacy of representation"), not a representation of the event through a structuration, chain of signifiers, or fictional structure; 5) news is not designed to change viewers' attitudes and values but to reinforce the perception of what is "important"; hence, news is designed to guide viewers' perceptions of reality and, sometimes, *be* reality (cf. Tuchmann). This latter point is reinforced by using a videotape made by a local newsfilm stringer of a particular story (lasting about seven minutes and composed of 15 different shots, with a sound-on-tape interview) and the final one-and-a-half minute broadcast version of that story.

With these kinds of concerns and problems in mind, the students are divided into three groups; each group is assigned to watch a videotape of the same night's local (i.e., Buffalo, New York) and network news program selected from a full week's tapes. By using the same night's news, although on different stations, and by timing each "item" of the news "flow" and attempting to make full notations about the audio and visual presentation of the news, the students are in a position to compare the (first level) descriptive information for all three local stations.

From there, the students move to a comparison of the three stations' handling of one story. This activity is supplemented with a separate handout, comparing the televisual story with the newspaper account of the next day.

f) television news as sole source of information/multifaceted news-gatherer
g) other concepts of a "real, social subject" rather than a *Screen* theorist's notion of "subject" constituted by a specific signifying practice.

In the process of this analysis (whether or not any of this can be accomplished during the actual presentation), I would hope to challenge several current concepts of "television," and especially "news" (ex. John Ellis's recent *Visible Fictions*, Heath & Skirrow's article "Television, A World in Action," Stanley Cavell's recent article "The Facts of Television," among others), including the following:

1) the television discourse/text as seemingly, or apparently, "live" (even when that can be determined, as it most often cannot),

2) the function of "direct address," with broadcast news being *the* example of the "direct address" mode of television, leading to notions of the "immediacy," "intimacy," and "presence" of the television image (versus the distance, and possibility for "voyeurism/fetishism" in film),

3) the determining dominance and "continuity" function of "sound" in television (versus that in film)--i.e., the attention that is accomplished through "direct address:" "I" to "You",

4) the "specific signifying practice" of the television discourse, including the notions (from Heath & Skirrow) of "regularity" as well as "flow" (Raymond Williams), of "codic heterogeneity," the specificity of "visible condensation and juxtaposition," and "time-live" junction/disjunction,

5) the function of "preferred" or "dominant" readings of the television discourse,

6) that an ideologically inflected meaning is clearly and directly correlated to/positioned for a (viewer, hearer) subject,

7) that many "social subjects" are ideologically inflected in the polysemic nature of the television discourse,

8) that what voices say (and are heard saying) and faces are (and are seen being) for a "positioned subject" only "glancing" (Ellis' term for television viewing) or "monitoring" (Cavell's term for television viewing) the news is exceedingly problematic,

9) other distinctions between "film/cinema" and "television" as recently compared by John Ellis.

It is highly unlikely that all that this outline presents can be accomplished during a short presentation--indeed, it is not always possible to become this detailed in my course--but enough can be accomplished to suggest that some of the initial concerns and problems stated at the outset of the presentation can be addressed very specifically, and with sufficient experiential understanding, to begin to rectify the theoretical and comprehensive abyss in which social scientific research and speculation has placed "television news."

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# USING TELEVISION TO TEACH VISUAL LITERACY: "YOU'VE RUINED T.V. FOR ME!"

by

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After his involvement in a television unit, an eighth grade boy remarked to me, "Gee, you've just ruined television for me. I can't watch it anymore without thinking about what we've learned in here. I'm too critical of T. V. to just enjoy it!" At the time, I was pleased at his frustration.

However, the development of visual literacy and critical viewing skills is not intended to "ruin TV" for anyone. Instead, visual skills can enhance viewing hours and can certainly carry over into other realms of learning. Visual literacy can be developed in many ways, and can enhance the appreciation of the arts and the world for students, young and old, who develop visual skills.

There are several definitions of visual literacy available in the literature. While elements of many definitions apply to the development of television viewing skills, the following definition has been used for the development of this paper. "Visual literacy is the ability to observe, to process elements, and to interpret; this viewing aptitude involves understanding both content and purpose of any image and appreciating structural and aesthetic composition in visual communications" (Esdale & Robinson, 1982, p. 4).

Regardless of the great number of hours (30 hours per week!) spent in viewing commercial television, films, and video games, students need guidance in order to develop their visual skills. They need to enhance their visual coding and decoding abilities. Many curricula exist today which are designed to assist educators in this necessary guidance, since just viewing does not lead to visual literacy. Both the IVLA Curriculum Guides recently published (1983) and the reference list included here can help educators find appropriate curricular activities for different students.

What areas are included in the development of television literacy? If television is to be studied as an art, as an important cultural entity, as a social influence, or as a commercial venture, we must critically analyze its many elements. Many of these elements are studied in other areas as well, such as art, sociology, political science, and journalism, so that many ideas developed through visual literacy study can be well integrated into many areas.

Analyzing television from these many viewpoints is an exciting and valuable endeavor. It requires an activity-based curriculum whose objectives are to enhance students' abilities to "observe, process, and interpret" the content and purpose of an image and its structural and aesthetic composition. The elements of this curriculum, generally, include 1) studying the elements of the art form of moving (TV) images, 2) practicing the production of moving (TV) images, 3) analyzing moving (TV) images from a literary viewpoint, including theme, plot, and purpose, and 4) investigating the commercial aspect of moving images (TV) and their persuasive techniques.

Historically, we study an art form by learning to recognize and appreciate its elements, themes, and techniques. The basic graphic design principles are also employed in television visual design and should be reviewed. The elements of line, shape, texture, color, composition, and balance are all a part of commercial television.

Once these elements have been recognized, the production of television images should encourage their retention. Television analysis should include an action approach, so students have an opportunity to experiment, duplicate, and create their own images. An understanding of the common television genres can also be enhanced by production, so students can direct their own news, documentaries, comedies, game shows, soap operas, and dramas.

These genres carry over into the analysis of television from the literary viewpoint. Each genre has its own conventions from literature that can be read, exemplified, and discussed. Literary analysis can include short story, play, or novel elements such as characterization, setting, plot developments, theme, tone, purpose, and style.

Those all-important commercial messages on television also use the literary conventions. They also draw, however, from a great deal of psychological and perceptual research on human needs, desires, and preferences, and societal pressures. The investigation of persuasive techniques should include an overview of this research and a critical look at that "60 second spot" so necessary to commercial television.

Using these four general areas as a guide, the television literacy curriculum could, then, use commercial television as its "teacher." Students could learn visual literacy from a range of viewing soft drink ads through "Nickolas Nicklebey." The production of television scripts and programs would serve to reinforce the decoding abilities as they are developed. The enhancement of visual awareness of color, shape, texture, and so on would transfer to student writing and appreciation of the other arts. Awareness of television genres could enhance reading ability and motivation. Familiarity with persuasive techniques could prevent students from being unnecessarily coerced by advertising messages of any kind.

With a new visual awareness, a developed visual literacy, students become more involved and aware of the positive and negative influences of television. They more carefully select their viewing. They are more aware of the affective nature of television messages, and become more broadly empathetic to aesthetically created messages. And, they develop as informed consumers of commercial messages. The thousands of hours of commercial television viewing can be utilized as an active vehicle, a positive learning experience, in the visual, aesthetic, production, and affective realms.

## Selected Resources

### Kits

*A Visual Fable* (1969, sound/filmstrip presentation with Teacher's Guide). Eastman Kodak Co., Rochester, New York.

Of particular interest to teachers and administrators establishing or expanding visual literacy programs.

*Making Sense Visually* (1969, sound/filmstrip presentation with Teacher's Guide, recommended for grades 5-12). Eastman Kodak Co.

Introduces some of the basic concepts and vocabulary of visual literacy.

*Media and Meaning: Human Expression and Technology* (1973, slide-tape presentation with Teacher's Guide, Parts 1 and 2). Center for the Humanities, Inc.

Traces media from the earliest transmission of information to the pervasiveness of television. Examines the role of media in the future and draws a few hopeful conclusions.

*Personal Communication: Gestures, Expressions and Body English* (1974, slide-tape presentation with Teacher's Guide, Parts 1 and 2). Center for the Humanities, Inc.

Encourages students to become sensitive to the clues of body language. They learn to understand what their associates are saying even when they are not speaking aloud.

*A Picture's Worth A Thousand Words: Interpreting Visual Information* (1977), (slide-tape presentation with Teacher's Guide). Center for the Humanities, Inc.

Examines the information that can be gained from pictures. Stresses photography as a seemingly objective, but very selective view of reality. Introduces special visual languages designed to communicate factual information, including maps, charts and graphs.

## Books

*Doing the Media*, Laybourne, Kit and Pauline Cianciolo (eds.). New York: McGraw-Hill Book Co., 1978. (Center for Understanding Media).

An extremely helpful book for teachers. Lists activities, ideas and resources for producing photography, films, and video in the classroom.

*Exploring Likenesses and Differences With Film*, Hood, Bette. National Film Board, 1981.

"*From Dick and Jane to Mork and Mindy*", Esdale, Barbara K. Edmonton: Alberta Educational Communications Corporation, *ACCESS Magazine*, November-January, 1981.

*Hands On: A Media Resource Book for Teachers*, Taylor, Anne. An Educational Support Project, Media/Research Division, National Film Board of Canada, 1980.

A good book full of ideas and examples.

"*Learning to Learn*", Dale, Edgar. *The Newsletter*, Ohio State University Bureau of Education Research, Vol XXIII, (May, 1963).

*Media and Kids*, Morrow, James and Murray Suid. Rochelle Park, New Jersey: Hayden Book Co., Inc., 1977.

A useful resource book aimed at bringing real world learning into curriculum.

*The Motion Picture and the Teaching of English*, Sheridan, Marian C. et al. New York: National Council of Teachers of English, 1965.

*Perception: The Senses at Work*, American Education Association. Xerox Corporation Publications, 1971.

*Planning and Producing Handmade Slides and Filmstrips for the Classroom*, Ring, Arthur. Belmont, California: Fearon Publishers, Inc., 6 Davis Drive, Belmont, California, 1974.

*The Problems and the Promise*, Sohn, David. Santa Monica, California: Pyramid Films, 1978. A Television/Video Workshop.

*Teaching Basic Skills with Film*, Bue, Marion and John Maboian. New York: Learning Corporation of America.

Presents excellent ideas and lesson plans for using film in language arts classrooms.

Teaching Tips from Teachers. Rochester, New York 14650: Kodak Markets Division, 1979. (Kodak Publication No. AT-18).

Television Awareness Training, Logan, Ben (ed.). A Media Action Research Center Publication. New York, New York, 1977.

Useful in designing a critical viewing skill (television) unit.

The Third Eye: A Portapak Handbook for Teachers, Moriarty, J. B. Ontario Educational Communications Authority, 1976. (Utilization Section, The Ontario Educational Communications Authority, Canada Square, 2180 Yonge Street, Toronto, Ontario).

Visual Learning Materials. Rochester, New York 14650: Kodak Education Markets Service, 1978.

Including: "How to Make and Use a Pinhole Camera" and "Photo Reports Make It Happen."

Visual Literacy: A Way to Learn--A Way to Teach, Fransecky, Roger B. and John L. Debes. Washington, D. C. 20036: Association of Educational Communications and Technology, 1972.

A general introduction to the concept of visual literacy.

Coping with Television, Littell, Joseph F. Evanston, Illinois: McDougal, Littell & Co., 1973.

A diversified collection of essays and articles reaching the areas of the impact of TV, TV production, the content of TV, TV ratings and advertising and how you can influence the media. Teacher's manual available.

Critical Television Viewing: A Language Skills Work-A-Text, produced by Public Television Station WNET/THIRTEEN, 356 West 58 Street, New York, New York 10019, 1980. Teacher's guide.

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*Who Turns Who On (Media Monograph No. 2)*, Bennett, Lisa and Corinne Drisa. Calgary, Alberta: Calgary Board of Education, 1979.

*Television's Impact on Children and Adolescents*, Lake, Sarah. Oryx Press, 1981.

Complete, indexed and organized by topics. Abstracts of over 500 sources of information.

Esdale, B. K. and Robinson, R. B. *Viewing in Secondary Language Arts*. Alberta Education: Edmonton, Alberta, Canada, 1982.

# ENHANCING HUMAN POTENTIAL THROUGH COMPUTER TECHNOLOGY

The most popular form of technology today is the computer. Its varied educational uses are illustrated first by Bassett, who explains how this tool has transformed the medium of multi-image projection. Dunker then discusses the word processing capabilities of both the mainframe and microcomputer in producing attractive layout.

Two papers, by Bloom and Braden and Braden and Bloom, describe and evaluate an experimental university micrographics course designed to teach both computer literacy and visual literacy. The interweaving of these two areas is pursued by Whiteside with his seven-step approach to enhancing computer literacy through the utilization of visual literacy activities. Ragan and Burroway provide an example from the children's computer language of LOGO to demonstrate further how computer graphics might aid in developing educational potential.

Molek summarizes the section with an overview of literacy technology from the printing press to the graphics tablet. He cites several commercial software packages, noting advantages as well as shortcomings, and concludes with the recommendation that producers of computer programs consult with visually literate instructional designers to ensure fullest use of the graphics capabilities of computer assisted instruction.

4

# THE POTENTIAL OF COMPUTERIZED MULTI-IMAGE PRODUCTION

by

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What is multi-image? It is difficult to define, in part, because at this point there are many different formats for multi-image shows. Some use multiple projectors on multiple screens, some use combinations of still and motion pictures, some use only stills projected at a rate that suggests motion similar to motion pictures.

The Art of Multi-Image, a handbook published by the Association for Multi-Image, defines multi-image as "a presentation that generally uses the 'ideal' number of three projected images (but is not necessarily limited to three), an electronic programmer, and sound reproducing equipment."

A way to understand the multi-image medium is to contrast it with single screen, single projector shows. Multi-image virtually always involves at least two projectors per single screen which means that when the slides change, the screen does not go black. Not only does the screen not go black between images, but often there is more than one image on the screen at the same time. This juxtaposition of images on the screen forces the viewer to participate actively in the creation of the meaning of the show; the viewer cannot sit passively but must seek out the relationship between images.

Multi-image is an attempt to overcome the linear or sequential progression of images commonly found in single projector slide shows and most motion pictures and video productions.

Multi-image shows typically have a high density of information. Ideally, the images are not simply redundant and repetitive, but extend the theme of the show obliquely, adding visual details and heightening the impact of the visual content. Some studies claim that it is precisely this density of information that enhances retention of the message of the show, but scientific testing of the efficacy of multi-image shows in presenting a message is still in its infancy.

The presentation of more than one image on the screen at any one time allows the producer to provide multiple viewpoints of the same subject simultaneously. As Kinney and Schmitt point out in their book titled Images, Images, Images, this approximates our normal pattern of perception. That is, we normally take a panoramic view of our subject, and then begin to focus in on specific details of the whole, while at the same time keeping the whole in view.

One of the most frequently used transition devices, the dissolve, creates an additional feature of the medium. Not only is the screen continuously illuminated, but there is a point at which the outgoing image and the incoming image are superimposed in such a way that a third image is created. The length of time that this third image is visible can be controlled by the dissolve rate.

The "third image" creates a meaning that is not contained in either the outgoing image or in the incoming image; the superimposed images can, when the superimposition is successful, ramify and extend the meaning.

John Ciardi has commented at length on a two-line poem by Robert Frost. The first line reads: "The old dog barks backward without getting up;" and the second line reads: "I can remember when he was a pup." Each line, of course, has its own meaning, but when they are juxtaposed the meaning ramifies further into a larger statement on aging.

The creation of the pace and rhythm of a multi-image show is an art, as it is in motion pictures or video. Many multi-image shows have a dynamic pace appropriate to the subject, often seemingly approaching a pace of image progression close to sensory overload. Sensory overload, and subsequent confusion, however, is a relative notion. If we think back to the turn of the century, when movies were just developing the conventions of that medium, some thought that the intercutting of two divergent scenes in order to tell both stories simultaneously would unnecessarily confuse the audience. Parallel editing now seems to us a commonplace of film grammar and the compression of the story usually enhances its meaning.

The compression of storytelling technique and fast-paced imaging that mark the typical multi-image production are not in any sense random or uncontrolled. The multi-image producer now has tremendous control over the pace of his show, and this control has been supplied by the computer, which has transformed the multi-image medium.

When experimentation began in the 50's and on into the 60's with multi-media and multi-image productions, the control was all in real time. Regardless of how many projectors or screens were involved, the control of the image progression was mechanical. And as such, there were limits to what could be done, and how precisely that could be done.

The computer transformed the medium, however, allowing the producer to determine the pace and rhythm of the show--not in real time, but in what is termed "leisure time." Contemporary computers allow access to and timing of every single image in a show. Leisure time programming refers to the fact that the producer does not have to watch his show live and try to design the flow of images while they are in motion. Instead, he programs time links between images, perhaps many images in a few seconds, shaping the design of his show one image at a time.

What the computer does is actually quite simple. In fact it can only do three things. It can turn the projector lamps on or off; it can move the projector trays forward or reverse; and it can time any of the methods by which the program links images together.

So, what we have in the multi-image medium is the ability to present a montage of images that can pass the threshold of sensory overload, and at the same time we have a means of control that allows the rhythmic design to be accurate to within a fraction of a second. The producer can construct the revelation and progression of images with utter precision.

The fact that there is--typically--more than one projector on each screen (usually in fact 3) creates an additional feature of the medium beyond the superimposition of images; it allows the creation of a sense of motion. Like motion pictures, all of the images are of course still images, but the rapidity with which the images can change creates an illusion of motion.

The creation of motion often involves a visual design that includes "masking" of the photography. The masks, created from line film, allow the designer to divide the space of the screen and then to move the images through that space. Images can move across the screen, can zoom in or out, or can move in most any other configuration that the designer feels appropriate to the revelation of the subject.

In addition, there is also the movement of one image transforming itself into another. As one image changes or dissolves into the subsequent image of a progression, a flow of motion impels the show forward.

This creation of motion, in addition to the juxtaposition of images, compels the viewer to participate actively in the discovery of the meaning of a show. The moving images attract the viewer's attention to different areas of the screen space and, through association of images, cause the viewer to make inferences cued by the design of the motion.

An important element in the creation, and continuity, of this motion is the soundtrack. Music, sound effects, and narration provide unity to the many discrete images, and it is interesting to note that narration is probably the least effective continuity device. That is, narration tends to slow the show down, to work against its non-linear nature. Multi-image in its most potent form works as a nonverbal medium.

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# USING THE COMPUTER FOR EFFECTIVE DISPLAY OF VISUAL LANGUAGE

by

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Editing an inexpensive book of readings such as this one written by many authors is a chore which requires much more than a red pencil, typing skills, and enormous amounts of patience. Instead, given the ultimate goal of producing a document which is not only filled with useful information (supplied by the many authors) but which is also visually attractive, the layout of each page, taken both individually and in conjunction with the adjacent page, must be considered. Since the page itself is an image, the authors expect that the factors which affect the display of visible language must be identified and manipulated in order to create visually pleasing images. Until recently, we've had little choice but to turn the "look" of the page over to the printer.

The recent growth in computer technology has given the word processor more control over critical decisions concerning page margins, justification and hyphenation, spacing between words, methods of visual cueing such as underlining, italicizing, and typing in bold face, and figure placement--decisions which affect the "look" of the page. Now more than ever, the word processor is responsible for using the computer to create pages of text and graphics which are visually appealing. As a result, computers and microcomputers are actually pumping new life into an old medium--print. For example, books like this one which would otherwise not be affordable are now viable.

Before undertaking a major word processing project, the available computer options should be carefully considered so that maximum utilization of computer facilities can be made. If possible, more than one system should be tested in order to more effectively assess the relative merits of each. For instance, last year, we used Script language on a mainframe computer and an IBM 6670 Laser printer to produce the IVLA book of readings. This year, however, we chose to use Screenwriter language on a variety of Apple microcomputers along with a letter quality Diablo printer. The choice was largely influenced by the lesser cost of using a microcomputer relative to the mainframe. The choice of Screenwriter over other available microcomputer word processors (e.g., Wordstar) was dictated by its compatibility with all of the Apples available to us, regardless of equipment model or modifications. Given our experience with both mainframe and microcomputer systems, we can now weigh the relative advantages and disadvantages of each for producing a visually attractive and comprehensible document.

Perhaps the most obvious visual element of the printed page is the amount and placement of "white space." This element is determined largely by the page margins, by whether or not the text is right and/or left justified, and whether hyphenation and proportional spacing are used. This paragraph is both right and left justified as well as proportionally spaced. It was done with a mainframe computer and Laser printer as described above.

> This paragraph shows more white space because two very simple embedded commands were given to the microcomputer (.lm 17 and .rm 72). Both the mainframe and the microcomputer can be used with equal ease for determining margins and justifying text. They are not equal, however, in terms of their hyphenation programs; the mainframe computer is much more reliable and easier to use. Script's hyphenation program is automatic and allows the user to predetermine the minimum number of letters left on a line after hyphenation. It also offers a dictionary where problem words can be manually hyphenated and stored for future reference by the computer.

Screenwriter, on the other hand, requires manual hyphenation--the computer asks the user how to hyphenate. Unfortunately, the user's instructions are not stored in memory; therefore, the user must "tell" the microcomputer how to hyphenate the same words over and over every time the text is printed. One other alternative which Screenwriter offers is an "automatic" hyphenation program whereby the user enters the text and uses tokens to hyphenate long words. The microcomputer then makes the decisions where to hyphenate based upon the user's suggestions. Either way, time must be taken to guide the microcomputer in its decisions.

White space can also be found between the words within a line of text. This space may detract from the visual appeal of the page in instances where the text is right and left justified and no hyphenation is used, because "rivers" of white space may occur in paragraphs where many long words appear. Even hyphenating the text may not totally solve the problem; often extra spaces must still be inserted between words in order to right and left justify. This is not a problem when proportional spacing is used. Script and the Laser printer provide the option of using proportional spacing. Screenwriter and the Diablo printer, however, do not have this option; therefore, some pages may show a little more white space within the text than we would like.

One other variable which may affect not only the visual image of the page but also the interpretability of the written text is the method used for visual cueing. Specific words or passages may be cued or emphasized in several ways: by underlining, by *italicizing,* by printing in **bold face**, or by using UPPER and/or lower case letters alone or in combination with one another.

Both the mainframe and microcomputer allow the user to underline or print in bold face or in upper and lower case easily. (For this book of readings, we chose primarily to use underlining for emphasis. We did opt to use bold face print in those few situations which we felt demanded it.) However, while it is possible to use italics with both computer systems, it is impractical to use them with the microcomputer since this would require either 1) stopping printing at exactly the correct spot so that the Diablo's daisy wheel could be changed, typing the text in italics, and then changing the daisy wheel again (a virtually impossible task), or 2) simply leaving a blank space in the text where the italicized elements could later be "waxed in." Printing in italics is not a problem with Script and the Laser printer; a simple command and token is all it takes to produce italicized text.

One final variable which may affect the "look" of the printed page is the placement of figures. Editorial decisions must be made which allow for the placement of figures where they can not only be easily referred to by the reader, but also where they provide the optimal balance between text and graphics. Fortunately, using the computer for word processing allows the user to juggle text and figures to achieve this goal. The mainframe and microcomputer are not equal in their ease of use for this task, however.

Screenwriter has a figure command which allows the user to leave space for figures. For example, six keystrokes were all that was needed to reserve 14 lines for Figure 1. However, if there were only spaces for 13 lines left on this page, a problem would exist requiring editorial intervention. Read about this in Figure 1.

When there are too few lines
remaining on the page for the figure
to be placed, Screenwriter bumps
the figure spaces to the next full
page without filling in text on the
page where the figure command first
occurred. Therefore, the user must
often count lines and force pages
to break so that figures can be
optimally placed.

Figure 1. Text example without hyphenation, left or right justification, or proportional spacing.

Spacing for figures is not a problem with all word processors. Script, Wordstar, and others move the figure to the next full page, and fill in the previous page with text automatically. Therefore, Script provides a means by which figures can be more easily moved in order to locate them in the text.

In summary then, both the microcomputer and mainframe computer provide reliable means for producing visually appealing and understandable documents. Both offer their own advantages and disadvantages for producing attractive texts. Therefore, the relative merits of each system should be considered before undertaking a word processing project so that maximum utilization of computer facilities can be achieved.

# ART AND SCIENCE: VISUALIZING WITH THE MICROCOMPUTER

by
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## Purpose:

This paper describes the goals, content, strategies, and outcomes of an experimental "micrographics" course recently offered at Virginia Tech. Because the course sought to teach visual and computer literacy skills concurrently, emphasis was placed on determining in advance concepts salient to both skill areas and refining those concepts so as to build a course with interdisciplinary appeal and applications.

## Background:

The course-design/teaching-team members represented a variety of disciplines and areas of specialization (Figure 1) which were reflected in the goals, the activities, and the results: Art (visualization, aesthetics, graphics, microcomputers); Interior Design (image design); Instructional Technology (instructional design, CAI, visual literacy); Communications (visual communication); and Computer Science (computer programming, computer literacy).

Entering students generally had either an art background and weak computer experience or a computer background and little art exposure. None of the students had extensive prior microcomputer experience.

## Graphics and Microcomputers:

GRAPHICS have been around for a very long time. There is a groundswell of evidence that graphics are powerful tools in computer applications. Recent applications have even extended into the fields of art and art education (Ettinger, 1983). Arcade games are often evaluated on the basis of the quality of their graphics. Business programs like VISICALC or PFS emphasize graphics to summarize and clarify complex information. Beginning programming courses in LOGO and BASIC typically rely on the motivational aspects of visual imagery. Too often, however, images have functioned chiefly as a means to programming ends or as illustrations of mathematical/logical relationships. As a result, the range of possible images has been artificially truncated. Our observations lead us to believe that in the jargon of computer users the term "graphics" is in danger of becoming synonymous with charts, graphs, and tables of figures. The widespread acceptance of such a narrow definition would be unfortunate indeed.

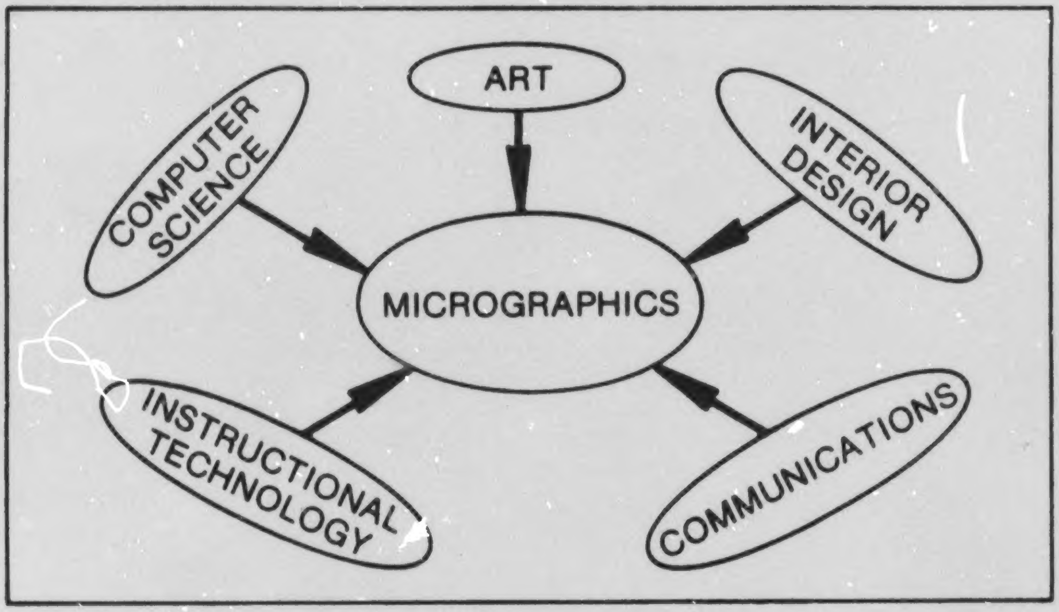

Figure 1. Interdisciplinary input to micrographics course.

MICROGRAPHICS is an exciting new area of creative endeavor that joins graphics and microcomputers. At the outset of this instructional development project, an assumption was made that micrographics could be found in the overlapping space between science and art (Figure 2). Throughout the events of the design phase and the subsequent instructional and evaluation phases, nothing occurred which would refute that assumption.

As a word, micrographics is a term that applies to visual imagery generated by microcomputers. Micrographic images can be highly motivating and instructive (like their counterparts in traditional print media). However, micrographics transcend simple images. Micrographics are also capable of interactive animation, where the image itself, its relationship with other images, and the sequence of displays are dependent on viewer input. While TV and Film have involved the motion elements, viewer interaction with motion media traditionally has been experimental and infrequent because the technology has been cumbersome. In contrast, the computer can easily make the viewer an active participant with the artist/illustrator/author in the creation of the work.

The enormous power of this marriage of image, animation, and interaction has only begun to be explored. In large part this has been true because computer graphics have been too expensive or too difficult to access or to understand by artists and illustrators--those who are trained in using visual language. Recent advances have changed all of that. With the advent of affordable, powerful hardware and layman-friendly software, it has become possible to emphasize the logic of visual imagery in tandem with computer strategies. The course was conceived as a vehicle to explore the teaching and learning implications of a rapidly developing area of new knowledge and expanding practice.

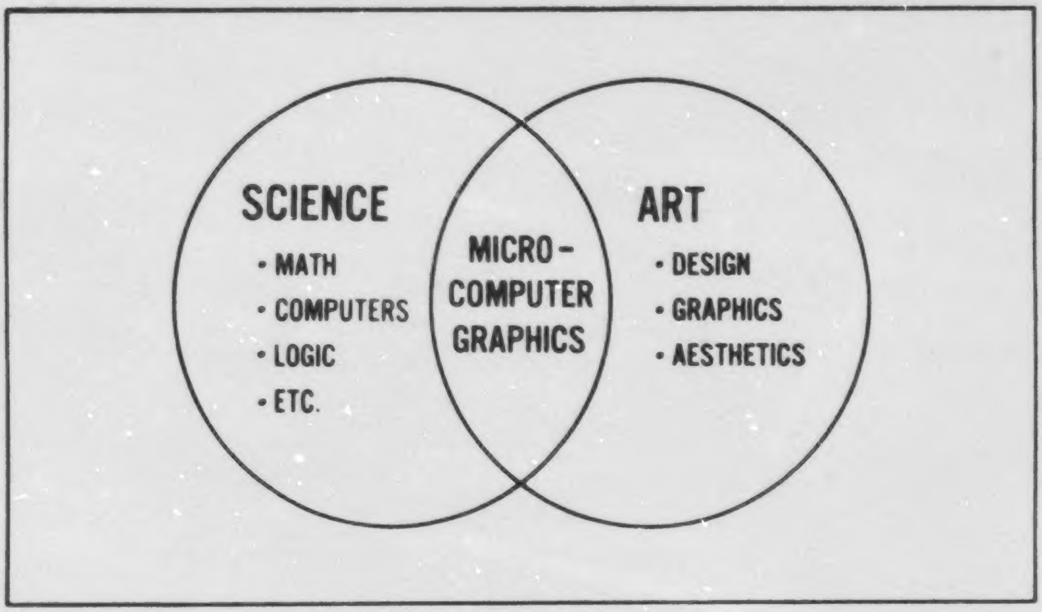

Figure 2. Microcomputer graphics in relation to science and art.

## Course Goals:

The Innovative Instruction Model (Braden & Bloom, 1983) and the content of the micrographics course sought to re-establish the traditional meaning of the Greek root "graphikos," with words and images both, and to extend this definition to the realms of movement and interaction. The achievement of acceptable levels of Computer and Visual Literacy were viewed as separate but mutually supportive goals.

An acceptable level of Computer Literacy in this context was conceived as the ability to create computer programs that result in computer-generated images (to avoid excessive software dependency and to foster an appreciation for program logic), the ability to use and control at least two commercial graphics packages (which permit creation of images prohibitively complex via the program-writing route), and the ability to use specialized graphics peripherals such as printers and the graphics tablet.

The goal of Visual Literacy embraced the complex interaction of visual effects possible in print and artistic media (static display), visual symbolism and the use of visual cliche, visual continuity, visual-verbal discontinuity, motion media (animation), and computer applications (interaction).

Note, please, that neither of the general goals is expressed in the confining manner of the Magerian objective (Mager, 1975). Also note that the authors have accepted the imprecise (and literally inaccurate) terms, "visual literacy" and "computer literacy" in their broadest and generally accepted sense. While aware of criticisms of non-literal usage of these terms (e.g. Cassidy & Knowlton, 1983), the project being reported was concerned with learning, not semantics.

The primary goals of visual and computer literacy entail learning concepts and skills in four sub-categories: programming, visual, artistic, and micrographic strategies. Within the skill categories many specific strategies and skills were later identified. When appropriate, these specifics were converted into objectives and organized into lessons. The complex interaction of the categories inspired the Innovative Instructional Model and their brief description which follows is offered only to show the "flavor" of the course content.

> PROGRAMMING: Commands, mechanics (like loops, subroutines, variables, and strings), sequencing, and documentation were identified as essential elements of the course content. The rationale of the course authors for including the listed programming topics was a desire to foster an understanding of the logic of program-generated graphics, to promote an appreciation of commercial software power, and to help students avoid "software dependency." Because micrographic programming draws upon well-established computer programming and documenting procedures, the available literature--including texts (Myers, 1982; Waite, 1979)--was more supportive of this segment than any other.
>
> VISUAL CONCEPTS: Under this category course content included principles of design, composition, figure-ground relationships, typography, primacy, and color mixing. These design basics were considered to be a minimal foundation for visual literacy. A separate text was employed (Lauer, 1979.) The frequently non-verbal nature of these concepts was approached through all of the teaching methods--large group, small group, individual tutoring, and self- instruction.
>
> ARTISTIC CONCEPTS: Content in this area involved the range of expressive types from literal or mimetic symbols to suggestive expression based on mood-value. The rationale was that students should become aware that meaning can be achieved in many ways in their visual

displays, and that criteria for artistic appreciation are not absolute (Feldman, 1979).

MICROGRAPHIC EFFECTS: All content in the micrographic effects category was considered to be optional but available. No one was required to learn how to create "special effects" with the microcomputer. Most elected to do so. The challenge of creating something with visual pizzazz had high appeal and served to motivate the typical student. Since micrographics involves visual effects stemming from the unique combination of characteristics of static and motion media, it was necessary to borrow and in some cases coin several specialized terms. These were needed to facilitate communication and to promote student understanding of the options open to them. Some terms, like "ping-pong" or "wipe" were already represented in the literature. Others, like "ripple" (real-time animation blending otherwise static binary files) or "flipple" (blending via moving blocks of memory) are exclusive to micrographics.

## Methodology:

A tutorial disk was developed to illustrate these effects and their combinations during classes and for individual use during laboratory hours. Paired with the tutorial disk were a series of assignments calling for the creative display of text; creation of low resolution and high resolution images; animation; efficient programming; creation, storage, and retrieval of binary files; and a final project. These assignments often combined the techniques previously described. For example, one class project was to "pop" a binary display onto the screen and then modify it via an interactive program.

## Outcomes and Lessons Learned:

1. Process: One of the chief outcomes observed was the ease with which the process of design can be documented. "Design" here refers to experimentation, assessment, revision, and elaboration common to the evolution of both computer programs and visual designs. The capacity to record the work at intervals during the design process is unwieldy in most media and often the process is obscured for students as a result. While the process of development is frequently the most important in learning, analyses are often influenced by outcomes, creating the illusion of a serial progression toward a solution--rather than a multiple-option pathway to one of many possibilities. The ability to backtrack through the design process (because of periodic "saving" of work) permits discussion of why and how decisions were made, and an elaboration of other options possible at each decision point.

2. Administrative: Close similarities exist between the set of teaching methodologies of the Innovative Instructional Model and those of the Audio Tutorial System (Postlethwait, Novak, &

Murray, 1972). Thus, as expected, there was a high cost in terms of preparation time (course design time). Also as expected, there was an above average time commitment to service the course--similar, perhaps, to that which would accrue with a PSI course (Keller, 1974). These demands upon the faculty members created less-than-positive reactions from administrators.

3. Experimentation: The capacity to save an interim product, modify it, save the outcome, try another variation, and save that version eliminates much of the risk and resistance to modification that are normally present when working on paper. Unacceptable outcomes no longer require hours of repainting or retyping, because the computer makes image and word processing a "no fault, no jeopardy" proposition. There was some initial student resistance to discussing interim (imperfect) stages of their work. This came as no surprise in view of normal grade-seeking behavior. However, the possibilities for using the computer as a forgiving design tool soon became obvious to students, overcoming their prior reluctance.

4. Logic: In many cases, the visual logic and program logic needed to minimize inefficiency, time, and trouble were similar. Beginners to programming and/or visual design tended to focus on details before context. Until this tendency was overcome, excessive time and effort were required to reach solutions.

5. Color Adaptation: With microcomputers, student artists work with additive color mixing on a monitor during the creative phases, only to be confronted with unacceptable images in hardcopy, because printers use subtractive color mixing. Satisfactory techniques to teach students to mentally visualize and anticipate the effects of transposition from screen to paper are yet to be developed.

6. Entry Skill Relationships: Students with arts-related backgrounds expressed greater difficulty early in the course (when programming was emphasized). Students with science and math backgrounds expressed greater difficulty later in the course (when visual impact was emphasized). In part this seems to have stemmed from the need for efficiency with flexibility in micrographics. Excessive concern for efficiency, a frequently observed characteristic of the science and math majors, can lead to stilted, mechanical looking images. Similarly, excessive exercise of flexibility in the name of artistic freedom--a tendency of the art majors--can lead to random and unwieldy solutions. Fortunately, all of the students demonstrated the ability to overcome the habits and attitudes that they brought into the course with them. To the delight of the teachers of this experimental course, the students tended to adapt, displaying a growing ability to weigh efficiency against flexibility on a case by case basis.

7. Synthesis: Just as visual literacy leads toward skill in visual thinking (Hortin, 1980), (micro)computer literacy leads toward skill in applying computer logic. When the two literacies

are combined in one individual, the result may well reflect itself in the habit patterns of that individual. For example, early indications suggest that the students who studied visual literacy and computer literacy concurrently in the experimental course gained an enhanced efficiency/flexibility integration capability. Since both visual literacy and computer literacy are internal intellectual attributes which can be enlarged, a relationship such as that in Figure 3 is suggested. Experimental research needs to be conducted to confirm or reject the validity of these indicators.

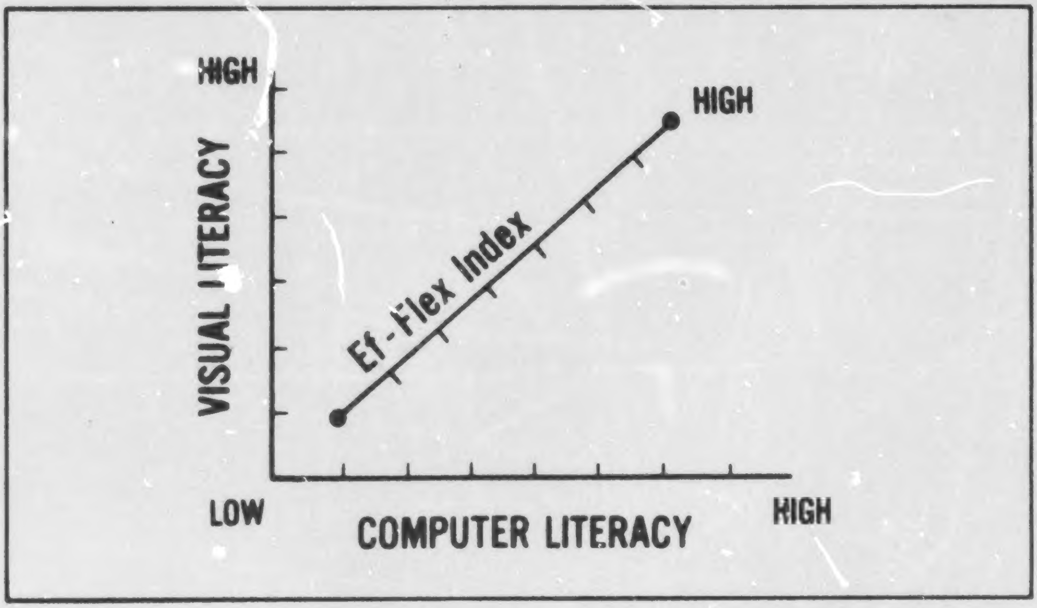

Figure 3. The Ef-flex index: A suggested relationship between visual literacy and computer literacy.

8. Science and Art: A striking parallel relationship between binary files in the Apple II memory and visual images on the monitor was demonstrated. Because each pixel (point of light) in high resolution has a mathematical counterpart in terms of its position on the screen and its color, it is moot whether the image illustrates the mathematical array or vice versa. This relationship established a common ground for students with disparate backgrounds, and did not lead to the problems stereotypically associated with "divisions" between science and art.

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# CREATIVE VISUALIZATION WITH MICROCOMPUTERS

by
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This paper is the report of a project which involved the classroom application of an innovative instructional model. The instructional model was specially structured to support the concurrent teaching of computer literacy and visual literacy skills. The purpose of the paper is to focus upon the instructional design, the teaching and tutoring techniques, and evidences of learning produced by the students, rather than upon the applied research aspects of the project. In that sense, what is to follow is an evaluation of an experimental Micrographics course rather than a research report about a teaching experiment. Even a cursory description of the innovative instruction model will reveal that several non-standard instructional strategies were combined in a setting where the instructors were as involved in learning how to conduct the course as the students were in learning the course content.

## The Innovative Instruction Model

Diversity, complexity, and expediency characterize the model. The authors began work on the course as a typical exercise in instructional design. However, in the course of a routine needs assessment the instructional need which emerged was clearly so atypical that we quickly agreed to construct and implement a unique model. Some of the factors which led to that decision were: lack of precedent in regard to all content decisions for this subject area, an extremely heterogeneous student population with a student analysis based entirely upon assumptions, lack of experience in dealing with the particular problems of the mimetic-creative spectrum with the microcomputer serving as the artists' primary creative tool, a theoretical leaning toward the process of purposeful grouping as a stimulant for corporate creativity, and a desire to reap the advantages of interactive learning techniques--regardless of whether they involve computers, other media, or person-to-person interactions.

With the many competing considerations that began to evolve, it soon became necessary to limit the scope of the course design project by establishing general guidelines which would set boundaries and clarify the purposes of the venture. Four general guidelines were affirmed. These were translated into the four general characteristics of the model. First, the project and its instructional products were to be goals oriented. Second, the course was to be interdisciplinary. Third, an eclectic (integrative) approach would be followed. And, fourth, an elaboration process would generally be followed in the development of content components. With these characteristics in mind, the course began to take shape.

## Goals

The sweeping goals of this project all centered upon learning. A pair of these aims were concerned with content--what was to be learned. Therefore the underlying purpose of the project was specified to be that the students would learn to be computer literate (whatever that meant) and that the students would learn to be visually literate (whatever that meant). The third broad goal was concerned with method, i.e., learning to be computer literate and visually literate was to come about, at least in part, through a process which we have labeled as corporate creativity (whatever that meant). Deciding exactly what the key terms meant was neither easy nor final. It was, however, part of a systems procedure that required the identification of evermore specific learning objectives. Learning tasks, steps, and procedures were planned to flow logically from each other. As this goal oriented approach was applied the details of the model fell into place. See Figure 1.

With the model complete (the general strategy settled) the detailed determination of subject content could be specified. As is often the case in course design, content selection actually became an exercise in non-selection. In fact, deciding which topics to leave out was the most frustrating step in the systems procedure. Once selected, however, each topic was readily converted into learning objectives and an appropriate instructional mode was easily selected from among the several options contained in the full Innovative Instruction Model. Note, therefore, that even at a very early developmental stage, the complexity of the model had already become an asset. (Complexity, by its very nature, is also a burden in the sense that the number of tasks to be performed is directly proportional to the number of elements in the model.)

## Interdisciplinary Characteristics

The project was seen to be interdisciplinary in several ways. Obviously, the learning goals were interdisciplinary--representing subject matter from the field of computer science, visual literacy goals from the field of education, and creative-aesthetic objectives from the field of art. Implementation of the program was multi-disciplinary in two other ways as well. First, the students were drawn from several quite different educational patterns. Second, the course was scheduled to be team taught by an interdisciplinary instructional team.

Until the course had actually been offered at least one time, it was necessary to make assumptions about the students'

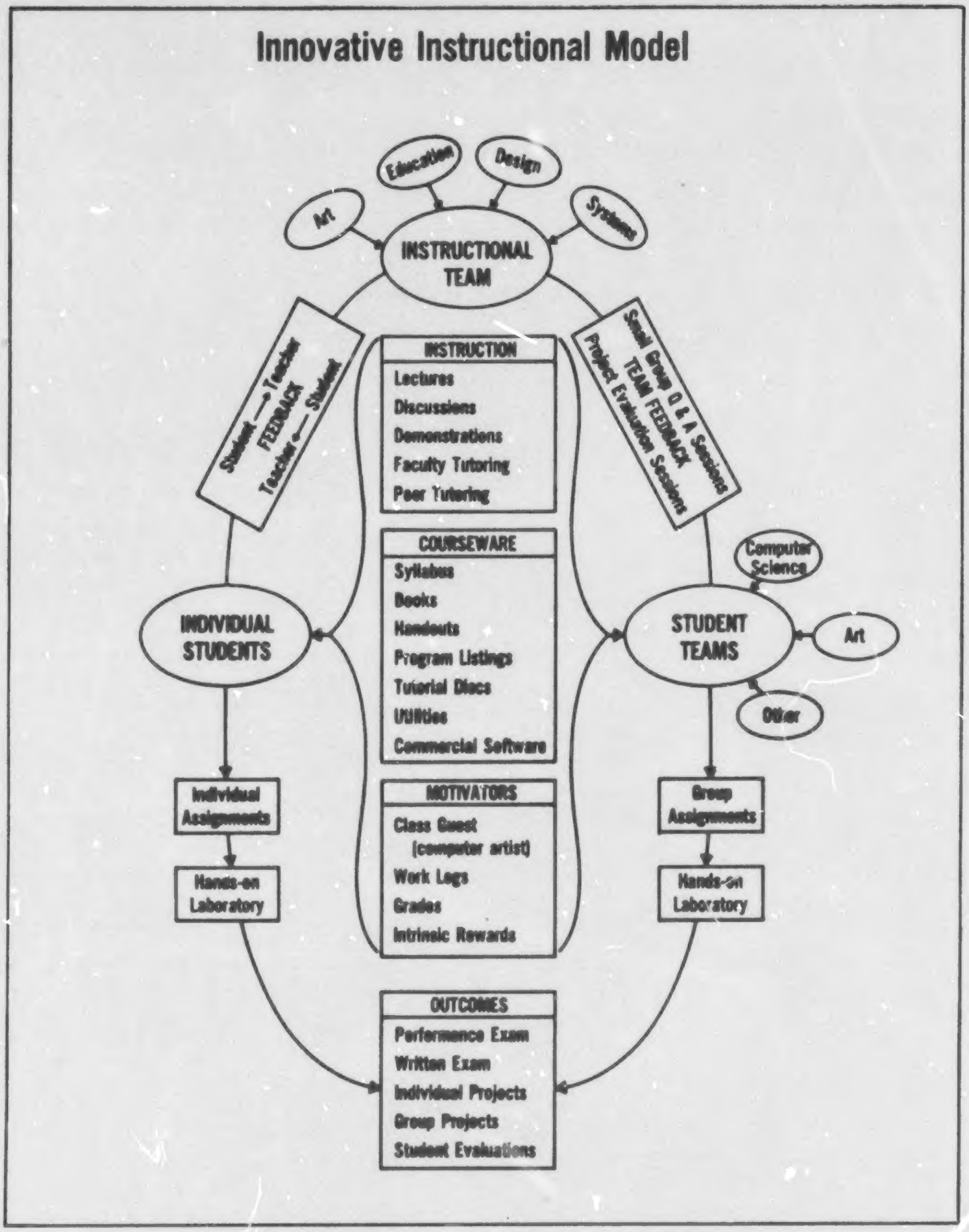

Innovative Instructional Model
Education
Design
Art
Systems
INSTRUCTIONAL TEAM
Student ⟶ Teacher
FEEDBACK
Teacher ⟵ Student
Small Group Q & A Sessions
TEAM FEEDBACK
Project Evaluation Sessions
INSTRUCTION
Lectures
Discussions
Demonstrations
Faculty Tutoring
Peer Tutoring
COURSEWARE
Syllabus
Books
Handouts
Program Listings
Tutorial Discs
Utilities
Commercial Software
MOTIVATORS
Class Guest (computer artist)
Work Logs
Grades
Intrinsic Rewards
INDIVIDUAL STUDENTS
STUDENT TEAMS
Computer Science
Art
Other
Individual Assignments
Hands-on Laboratory
Group Assignments
Hands-on Laboratory
OUTCOMES
Performance Exam
Written Exam
Individual Projects
Group Projects
Student Evaluations

Figure 1. Innovative instructional model.

backgrounds. In that context, we assumed (correctly) that the students were likely to come from three undergraduate majors:

a. Computer science
b. Art
c. Education

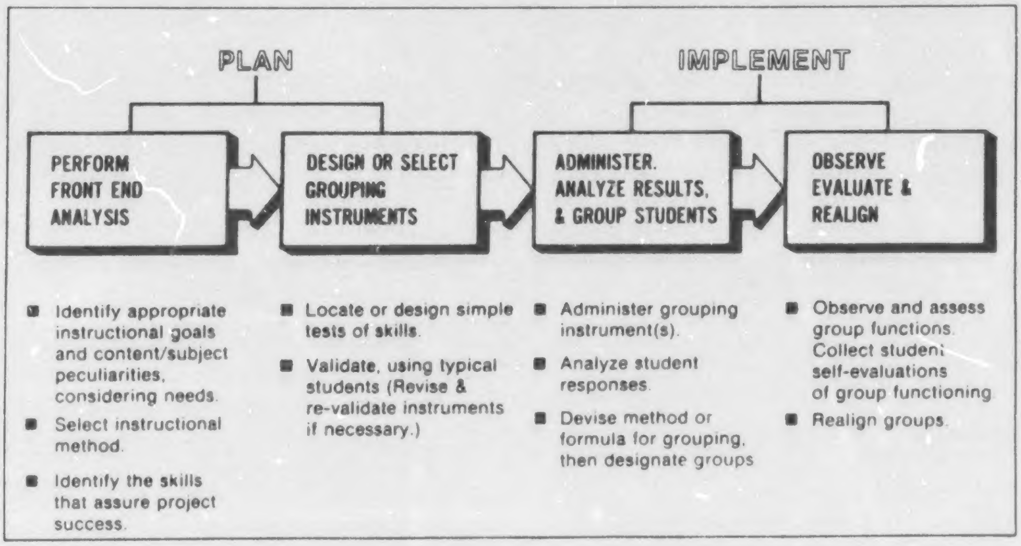
The instructional team which we were able to assemble was comprised of three faculty members and a graduate assistant. Each came from a different discipline and thus each contributed a different insight during both the design phases and during the delivery of the course itself. The fields represented were:

a. Art [Education]
b. Education
c. [Interior] Design
d. [Educational] Systems

## Purposeful Grouping

This project utilized "purposeful grouping", a procedure extracted from an earlier instructional experiment (Cosmas, Meadow, & Braden, 1980; Mohler, 1980). The primary features of purposeful grouping are shown in Figure 2. In regard to the purposes and expectations of this project, important aspects of the procedure are that purposeful grouping:

...is goal oriented.
...encourages peer tutoring.
...mirrors the reality of the work world in the instructional setting by anticipating (and encouraging) differentiated contributions.
...affords flexibility because testing need not adhere to the rigor of research standards.
...has its highest potential when a heterogeneous student body is anticipated.
...facilitates interdisciplinary melding, and thus (in all of these ways)...
...supports corporate creativity.


PLAN
IMPLEMENT
PERFORM FRONT END ANALYSIS
DESIGN OR SELECT GROUPING INSTRUMENTS
ADMINISTER. ANALYZE RESULTS, & GROUP STUDENTS
OBSERVE EVALUATE & REALIGN

- Identify appropriate instructional goals and content/subject peculiarities, considering needs.
- Select instructional method.
- Identify the skills that assure project success.

- Locate or design simple tests of skills.
- Validate, using typical students (Revise & re-validate instruments if necessary.)

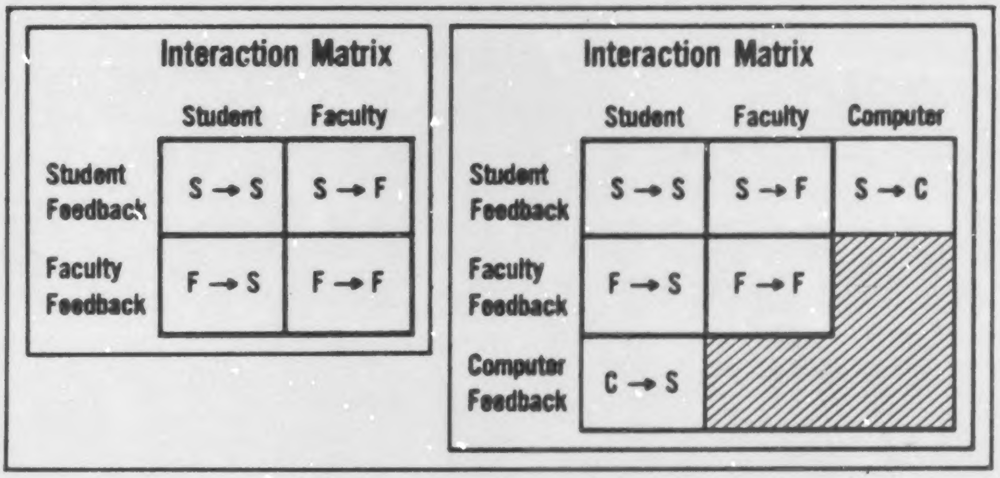
- Administer grouping instrument(s).
- Analyze student responses.
- Devise method or formula for grouping, then designate groups

- Observe and assess group functions. Collect student self-evaluations of group functioning.
- Realign groups.

Figure 2. Purposeful grouping procedure.

## Interaction

Limited communication options characterize the typical college course. Too frequently that means teachers talk to students (lecture), ask them written questions (give tests), and receive student responses (collect test papers). Without doubt, the diversity and the quality of that sort of minimal interaction can be increased. For example, the simple addition of oral questions and answers in class turns lecture into discussion. Even so the interaction is usually limited to a pair of human interaction possibilities: teacher-to-student or student-to-teacher. Little if any student-to-student interaction is facilitated. The instructional model for the Micrographics course was intended to foster four types of person-to-person interaction as depicted in the left matrix of Figure 3.



**Interaction Matrix**

| | Student | Faculty |
|---|---|---|
| Student Feedback | S → S | S → F |
| Faculty Feedback | F → S | F → F |

**Interaction Matrix**

| | Student | Faculty | Computer |
|---|---|---|---|
| Student Feedback | S → S | S → F | S → C |
| Faculty Feedback | F → S | F → F | ▨ |
| Computer Feedback | C → S | ▨ | ▨ |

Figure 3. Expanding the interaction matrix.

At times the interaction dimension was further enriched by incorporating interactive computer courseware. Even non-interactive activities with the microcomputer provide students with instant feedback when the students are able to observe the computer's reaction to their input. Therefore, the expanded interaction matrix of Figure 3 depicts six generic categories of interaction for the Innovative Instruction Model. In addition to increased options, there was intentional emphasis on interaction.

## Elaboration Process

The instructional philosophy adopted for the course drew heavily upon advance organizer theory (Ausubel, 1963; Hartley & Davies, 1976) and elaboration theory (Reigeluth, 1979; Sari & Reigeluth, 1982). Although a great deal of latitude was allowed for deviation as demanded by classroom developments, learning was planned to take place via an elaboration process (Figure 4).

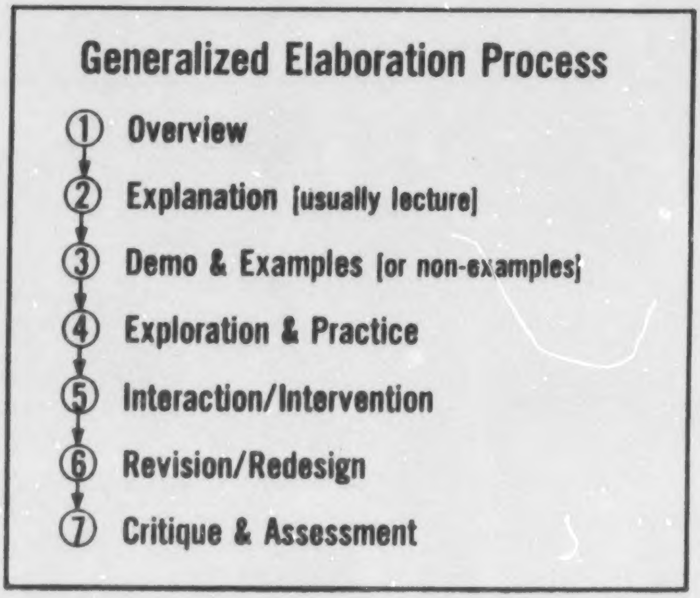

Generalized Elaboration Process
① Overview
② Explanation [usually lecture]
③ Demo & Examples [or non-examples]
④ Exploration & Practice
⑤ Interaction/Intervention
⑥ Revision/Redesign
⑦ Critique & Assessment

Figure 4. Generalized elaboration process.

The advance organizer was frequently provided in written form--an assigned reading, a pre-discussion handout, or even a text segment on a microcomputer disk. Explanations were didactic but short--lecturettes of 15-20 minutes--given both to the class as a whole and to small group sessions. Demonstrations included how-to and what-if examples. After students were given an opportunity to practice and experiment, comments were provided by faculty upon their progress. Occasionally a student or group went far enough astray that faculty intervention was needed to get them back on productive ground. Students were always encouraged to refine their projects before offering them as finished products to be critiqued (by both peers and faculty) and, in some instances, graded. Grading of visuals usually followed the "judging" pattern common to the field of art. The critical process of description, analysis, interpretation, and judgment outlined by Feldman (1967) was central to individual and group critiques. Formalistic analyses (Lauer, 1979) were based in part on the design of the students' works.

## The Range of Student Creativity

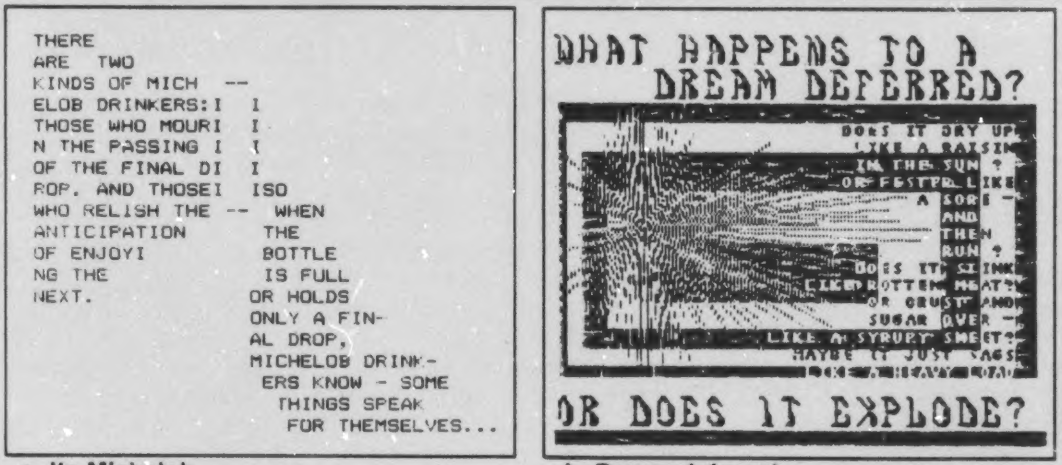
Even though the course title was Micrographics, the "drawings" definition of graphics was expanded to include any visual display. The broader definition accommodated the idea that verbal and visual messages are not discrete on the screen, even when only blocks of text are displayed. Students were required to create microcomputer "graphics" which covered a wide variety of word-picture combinations. The images that resulted spanned a range from "visible language" through "word-bearing illustrations" and "cultural symbols", to "illustrated text" and "artistic imagery." The importance of combined visual and verbal impact was made constant across that continuum, even though literal (verbal) cues become less and less potent as images become more artistic. Thus, in all but the artistic imagery category, students were asked to strive for visual/verbal symbiosis and to avoid visual/verbal discontinuity. They also were instructed to consider the mood value of the words and images in the displays they created.

The "Michelob" design in Figure 5a is typical of the visible language images created by students. Images in this category would be classified on Ralph Wileman's visual/verbal image relationship scale as Types I through III (Wileman, 1980). These works configured words and letters of the standard screen font in blocks and shapes with special attention given to the overall visual appearance of the layout. The message of these student creations stemmed more from the language used than the visual organization, but the layout frequently contributed significantly to the overall impact.

Word-bearing illustrations like that in Figure 5b used a variety of type styles, sizes, and more visual/verbal interaction to create displays that were sometimes less easy to read. These designs derived more of their impact from the non-verbal component, and related to Wileman's Types IV and V. Most works in the word-bearing illustration category continued to adhere to primacy, i.e., they could be read from left to right and from the top to the bottom of the screen, with varied line justification. Charts and graphs also fall into this category but were not emphasized.

"Cultural images" were produced in low and high resolution without actual text, but often with strong verbal implications. Like the "train" in Figure 5c (and Wileman's types VI and VII) these images are easily associated with a thing and its name because of their iconic sign qualities. That is, these are images which resemble that for which they stand [see Knowlton (1966) for further discussion of the concept of iconic sign]. Although the images can vary within limits, their conformation is almost as culturally fixed as the word-forms associated with them. Accordingly, works in this category relied heavily on literal interpretation for meaning even though actual text was absent.

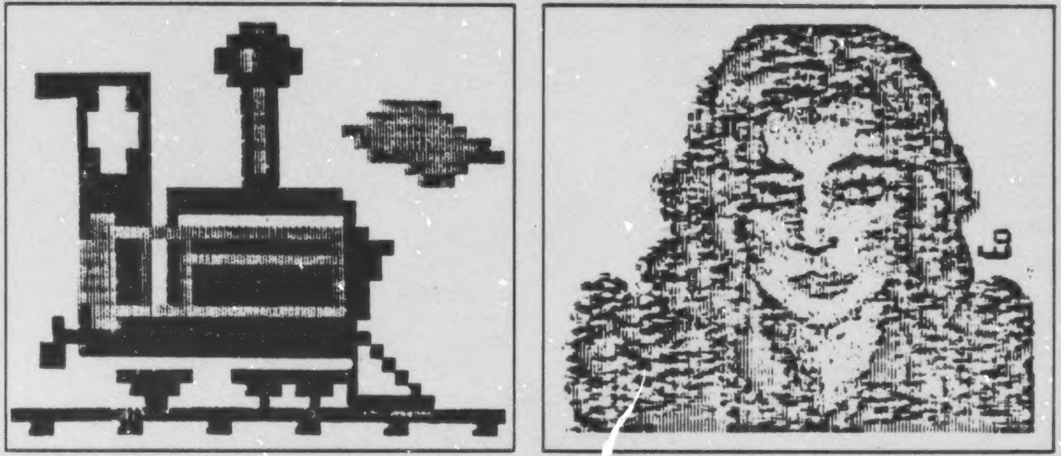
Students also created several varieties of illustrated text. These included works like Figure 5d that were associated with but did not include words. This category is related to illustrated books, with the exception that when using inexpensive microcomputers (we used Apple II's) even "high resolution" displays can not include the detail and nuance possible in print. As a result, the meaning of works of this type relied heavily on simplicity, symbology, cuing and other basic visual literacy principles. Text in previous or succeeding displays (and in the 'text window' at the bottom four rows of the screen) helped to provide the context for interpreting the illustrations.



THERE
ARE TWO
KINDS OF MICH --
ELOB DRINKERS:I I
THOSE WHO MOURI I
N THE PASSING I I
OF THE FINAL DI I
ROP. AND THOSEI ISO
WHO RELISH THE -- WHEN
ANTICIPATION THE
OF ENJOYI BOTTLE
NG THE IS FULL
NEXT. OR HOLDS
ONLY A FIN-
AL DROP,
MICHELOB DRINK-
ERS KNOW - SOME
THINGS SPEAK
FOR THEMSELVES...

WHAT HAPPENS TO A
DREAM DEFERRED?
DOES IT DRY UP
LIKE A RAISIN
IN THE SUN ?
OR FESTER LIKE
A SORE -
AND
THEN
RUN ?
DOES IT STINK
LIKE ROTTEN MEAT?
OR CRUST AND
SUGAR OVER -
LIKE A SYRUPY SWEET?
MAYBE IT JUST SAGS
LIKE A HEAVY LOAD
OR DOES IT EXPLODE?

**a. Its Michelob** **b. Dream deferred**



**c. Train** **d. Girl**

Figure 5. Examples of student creativity.

Student creativity also expressed itself in emotive-aesthetic creations. The result was "art-images" which relied entirely on visual factors for meaning. The authors stop short of labeling the creations "fine art." However, whether naturalistic or non-objective, these student-made artistic images could be seen to exist for their own sake, with any verbal mediation to be imposed by the viewer. Thus while these works lack the artistic heritage and prestige of painting, drawing, or sculpture, they are born of the same visual principles and must compete in the same ways for the appreciation of the viewer.

## Interactive Images and Text

All of the preceding categories have counterparts in traditional print media. Through the microcomputer they extend into

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special effects that are impossible to document on paper. Displays that develop gradually on the screen, animations that move and/or modify images, and images that depend on variable viewer feedback (like games or tutorials) were often created. A critical design function for student programmers whose creations called for viewer feedback was to anticipate likely human responses so as to program appropriate computer interactions. Therefore, it was necessary to consider pace, direction, sequence, and the communicating power of displays (both visual and verbal) in designing and evaluating student work.

## Conclusions

The details of the Innovative Instructional Model (Figure 1) are uniquely applicable to the micrographics course which brought the model into being. Stripped of those course-specific details, the framework of the model (Figure 6) remains as an integrated instructional strategy which may have future utility.

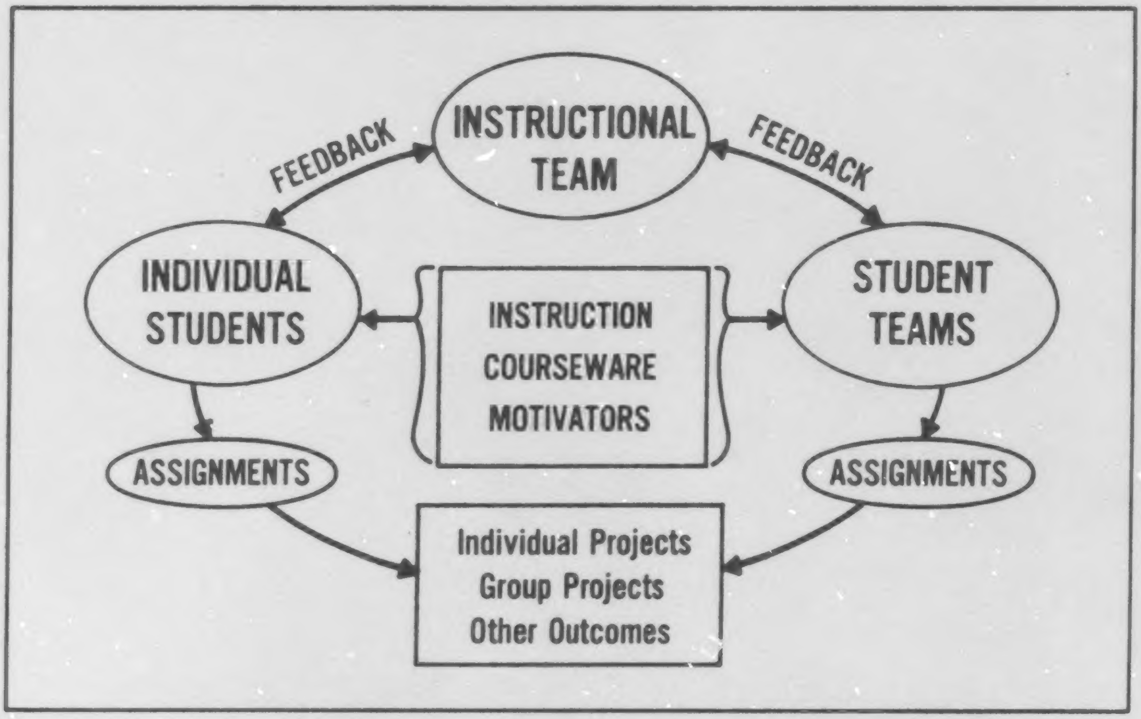
INSTRUCTIONAL TEAM
FEEDBACK
FEEDBACK
INDIVIDUAL STUDENTS
INSTRUCTION
COURSEWARE
MOTIVATORS
STUDENT TEAMS
ASSIGNMENTS
ASSIGNMENTS
Individual Projects
Group Projects
Other Outcomes

Figure 6. An instructional model.

The purposeful grouping technique was successful in this case as a device to encourage peer tutoring. In addition the technique supported the concept of corporate creativity.

A course goal which included both visual literacy and computer literacy objectives proved successful. Students who are learning to make the microcomputer produce various kinds of images are vitally concerned with the appropriateness and effectiveness of the visual images they create.

The open laboratory policy was essential to the success of the course. Student controlled practice and experimentation along the mimetic-creative spectrum is important to the development of visual literacy sophistication as well as computer programming skills. Team teaching, tutoring options, and availability of instructional materials in various formats tended to support the laboratory experience where the bulk of learning took place.

Evaluating the project overall, with respect to the goal that computer literacy and visual literacy can be taught concurrently, we concluded that the microcomputer was demonstrated to be a versatile, powerful visual communications medium. Although its potential complexity is enormous, it is possible to simplify and sequence the visual, verbal, and programming concepts involved so that not only computer literacy but also visual literacy is fostered.

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# ENHANCING COMPUTER LITERACY THROUGH VISUAL LITERACY

by
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The 1980's have been called the 'Computer Age'. This year began with a major news journal nominating a microcomputer as the man of the year. In the Spring a national committee that had been investigating public education suggested that schools should begin teaching computer literacy. The purpose of this paper is to suggest a sequence of steps which can be used to enhance computer literacy through the utilization of visual literacy activities.

I would like to suggest a seven-step approach to enriching computer literacy experiences with a variety of visuals. These steps are: define concepts, identify needs, prioritize needs, select software, choose hardware, implement enhanced programs, and plan for future enhanced computer literacy activities.

The first step involves defining computer literacy and visual literacy. This would appear to be a simple task until one begins to read the literature. David Moursund, one of the early pioneers of microcomputers in education, stated that, "computer literacy may be defined as the knowledge of the non-technical and low-technical aspects of the capabilities and limitations of computers, and of the social, vocational, and educational implications of computers" (1975, p. 2). More recently, a variety of definitions have appeared which reflect a range of insights into this developing area. Two of the more widely held definitions were stated by Warren Jones and Peter Coburn. Jones defined computer literacy as,

> An appreciation of the general principles which underlie computer hardware, software, and the application of computing technology to various science, business, education, government, and entertainment objectives (1983, p. 4).

Coburn paints an even wider concept suggesting that computer literacy should include ". . .all the skills, understanding, and values needed to function effectively in a society permeated by computer and information technology" (1982, p. 56). I would like to use Coburn's definition in order to maximize the potential opportunities for educators to learn and share computers with their students. This definition also provides a wide range of possibilities for visual literacy experiences to be used to enhance computer literacy.

A similar situation exists in regards to identifying a standard definition for visual literacy. John L. Debes is credited with coining the term visual literacy in the late 1960's. He helped to organize the First Annual National Conference on Visual Literacy in March, 1969. As a result of that conference, Debes wrote a report in which visual literacy was defined as a group of visual competencies a human being can develop by seeing. He stated that, "The development of these competencies is fundamental to normal human learning" (1970, p. 14). Recently, several other definitions have been recorded. I would like to utilize one by Ausburn and Ausburn in which they stated: "Visual literacy can be defined as a group of skills which enables an individual to understand and use visuals for intentionally communicating with others" (1978, p. 291). This definition shares several of the areas emphasized by Coburn in his definition of computer literacy. The focus on skills and understandings in both definitions should suggest that educators can establish goals and behavioral objectives for these literacies. Both definitions encompass a rather broad collection of possible topics that are already part of most curriculums or could be easily added.

Therefore, having identified definitions for the two areas, step two involves identification of computer literacy needs. Three groups, students, parents, teachers and administrators, should be included in computer literacy goals. The first group is students. Most experts suggest developing a sequential K-12 program with a wide variety of experiences. Students and educators at all levels should be involved in the identification of computer literacy needs. Some possible visual experiences to develop computer literacy awareness could include viewing Walt Disney's Educational Media film, "Living with Computers." This film's focus is on how computers are becoming a part of daily life and emphasizes the importance of computer literacy. Other resources include the recent motion picture "War Games," which dealt with teenagers manipulating computer networks for their own purposes, or watching the television series "Wiz Kids." These types of mass media could help to inform educators of some of the issues involved in computer utilization.

In addition to learning experiences for students, in-service opportunities should be explored for teachers and administrators. An excellent source of information on this topic is the Association for Supervision and Curriculum Development's video tape, "Computers in the Classroom." This video-tape presents an overview of in-service training in Dallas. John Hortin has recommended another type of visual literacy experience to prepare for computer literacy curriculum development. Hortin has suggested a creative visualization approach to in-service training. He stated:

> Visual rehearsal of future events in one's mind is a strategy for coping with change of the experiences of new technology. Suppose, for example, a school decides to

> purchase microcomputers for its mathematics program. The adoption of this new curriculum could be visually rehearsed by members of the curriculum committee to anticipate problems, advantages, disadvantages, consequences, choices, and strategies (1983, p.233).

Finally, planning should include informing parents and the general public about computer literacy. Again, a variety of visuals should be used to effectively communicate with these audiences. Schools should send out well designed computer literacy questionnaires that use appropriate layout and graphics. These should be written with a minimum of computer jargon and sufficient illustrations for easy understanding. Another visual media, television, could be utilized in communicating with the school's community. Students could video tape interviews and discussions about the district's plans for computer literacy. Then, local television stations could be asked to broadcast them as a public service. Many cable television stations are already cooperating with schools in this type of service.

Step three is selecting and prioritizing the list of identified computer literacy needs, goals, and objectives. In regards to selection, educators may find it helpful to refer to one of the nationally published K-12 computer literacy curriculum outlines. One K-12 curriculum was presented in several recent issues of "Electronic Learning." Gary Bitter, from Arizona State University, recommended utilizing a variety of visual media to enrich computer literacy learning. One example, for fourth graders, was to "have students collect computer store ads, catalogs, and flyers or write to companies for catalogs. Using these, create a class computer file with index cards describing various computer components" (1982, p.45). Another source of curriculum development information is Beverly Hunter's My Students Use Computers, Computer Literacy in the K-8 Curriculum (1983). Hunter included many visual literacy experiences for her computer curriculum. One involved making large posters, with a sequence of drawings, illustrating the procedures required for setting up a second grade classroom art center. She felt by starting with a familiar classroom task, and moving toward flow charting computer programs, it would be easier for students to understand the process.

Posters could also be used as part of the process of prioritizing needs by informing teachers of identified computer literacy needs. These could be displayed in departmental offices and faculty lounges. Hopefully, these visuals would encourage educators to participate in the selection process as well as help teachers become aware of computer literacy topics. The faculty could be informed of the final list of needs, goals and objectives by utilizing a combination of hand-outs, posters, and overhead transparencies at faculty meetings.

Once the needs, goals, and objectives have been identified and prioritized, the next step is to select appropriate software. I have found a three-stage approach successful with graduate students, teachers and administrators. First, run several instructional programs with two to four educators in micro-groups at each computer. I recommend that each member of the micro-group have an opportunity to sit directly in front of the monitor and operate the keyboard for an entire program. I believe that by rotating the roles and physically moving to different viewing positions, teachers can become aware of visual literacy factors for computer activities. Following each program, I ask them to list and discuss positive and negative comments related to the program's usefulness for instruction. Next, the teachers are given software evaluation checklists and asked to utilize them to pinpoint specific strengths and weaknesses of other educational programs. The software evaluation checklist I have developed for these experiences contains six major sections. These sections are program documentation, instructions given to student, program's instructional features, motivational devices, content, and overall evaluation. The form includes several questions related to visual literacy principles. Some of these questions ask whether the user has control over the pacing of the display, is the screen formatted for ease of reading, does the program utilize standardized methods of visually responding to questions, and are graphics and colors appropriately used.

I believe that we should stress the importance of well designed screen displays as part of software evaluation. Programs should follow established guidelines for instructional video displays in the areas of eligibility, space, color, and graphics. Malcolm Fleming listed several principles, in Instructional Message Design, that are relevant for designing computer screen displays (1979). One principle suggested was that learning can be facilitated where initial learning is maximally cued to assure correct responding (1979, p. 115). Henry Simpson agreed with this principle in his article, "A Human-Factors Style Guide for Program Design" (1982, p. 110). He suggested that instructional designers follow his 'consistency' principle, in which programmers establish a set of rules for their programs and follow them compulsively. This could apply to the visual aspects of the screen display. One example is the consistent placement of error messages on the bottom line of the screen. Another application would involve utilizing a screen display format that resembles a standardized paper form. Simpson also recommends using blank lines and color-coding different screen areas to assist in user understanding of the software.

Having identified needs, goals, objectives, and selected software, step five is choosing computer hardware. Educators should carefully match selected software with the computer system to avoid software incompatibility. I recommend using a hardware evaluation checklist which allows potential buyers to compare the attributes of several systems. The evaluation form I have developed utilized a Likert rating scale with a list of ten essential attributes of microcomputers. These ten attributes are computer memory, software, service, cost, keyboard features, screen display, color, sound, programming languages, and peripherals.

Educators interested in using microcomputers for visual literacy experiences should consider the following guidelines. Select a microcomputer with at least 64 kilobytes of random access memory. Computer graphic displays require a large amount of memory. Choose a computer with a large library of software. It usually takes two to three years for software publishers to develop a quantity of programs for a new computer system. Look for local service with a good performance record. This is important with specialized graphic peripherals such as printers and plotters. Check keyboard features by hands-on practice with the particular units. A desirable feature is a diamond shaped block of cursor movement keys. This pattern is particularly helpful in graphic and word processing application programs. Screen displays and color should be evaluated on the basis of intended applications of computers. If the major use is to be text presentation, then an adjustable green or amber screen monitor is a good choice. If the computers are going to be used for both text and color graphics programs, then a color monitor could be a compromise solution. For the finest quality color presentation, a RGB monitor system will provide the best screen displays. Finally, there are special large group applications where some sort of video projection should be considered.

The availability of three programming languages should be considered for visual literacy experiences. First, identify a version of BASIC that contains easy to use high resolution color graphics. Unfortunately, since the original BASIC did not contain graphics, there are many variations of BASIC graphics and these should be investigated before purchasing. Second, a form of Pascal should be available for the particular computer. The structured approach required in Pascal, as well as some excellent graphics, makes it a desirable option. Third, a LOGO language package is rapidly becoming an essential for computer literacy programs at the elementary school level. It can also be used to introduce other age groups to many aspects of programming using a graphics approach.

Educators should investigate the availability of computer peripherals. These could include dot-matrix color printers, plotters, graphic tablets, light-pens, and video cassette tape recorder interfaces. The largest variety of peripherals are available for the most popular microcomputers. Initial costs of computer systems are important, but the final decision must include other attributes.

Step six involves implementing computer literacy curriculums that have been enhanced through visual literacy experiences. It has been my experience that elementary school teachers use a wide variety of visual experiences in their teaching. One implementation approach to informing secondary level teachers of possible visual literacy opportunities could include visits to elementary classrooms during enhanced computer literacy sessions. Hunter's K-8 computer literacy curriculum guide contains many excellent suggestions on how to produce and use visuals. Teachers and administrators should also preview some of the excellent 16mm films, video tapes, filmstrips, slide sets, and overhead transparencies on computer literacy. These investigations should take place during the planning stages of implementation in order to increase the possibilities of enhancing their computer literacy curriculums. Illustrated books are another source of visual enhancements. Implementation should involve some pilot testing of new materials. Selected teachers and administrators should be involved along with the students in identifying strengths and weaknesses. Possible revision in implementing computer literacy curriculums should include all aspects of learning from the physical arrangements of computers to the sequence of concepts to be presented. Early revisions can often avoid major problems later.

The last step is planning for future enhanced computer literacy activities. The introduction of the Apple LISA has signaled an increased awareness of visual literacy by the microcomputer industry. The LISA uses an innovative visual approach of graphic symbols or icons to present its menu of application. The same type of graphic approach is used in Sierra On-Line's Homeword word processing program. The software utilizes the bottom third of its screen display to present a set of icons representing each of the major word processing functions. By pressing the right or left cursor movement keys, the user can select a desired function by moving the 'icon cursor' to the appropriate icon and pressing the return key. These visual enhancements are increasing the user-friendliness of programs, an important aspect of computer utilization. Educators involved in computer literacy need to take note of these hardware and software trends in updating their curriculums.

If schools are going to be successful in teaching computer literacy, they must provide a variety of learning activities enhanced through visual literacy experiences. The computer age brings with it many promises for a brighter tomorrow. Educators should not dim these guiding lights by limiting computer literacy experiences. Rather, we should provide visually enhanced learning to optimize our students' entrance into the computer age.

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# MICROCOMPUTER GRAPHIC CAPABILITIES: A DEMONSTRATION AND DISCUSSION OF INTERACTIONS WITH VISUAL LITERACY GOALS

by

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Visual literacy is fundamentally concerned with improvement of communication skills and problem solving abilities of learners. Established means to these ends are through such activities as film and video analysis, making films and video, and development of slides and drawn sequences of still images. Sequencing is fundamental to visual literacy theory in its mainstream. When the term "visual literacy" is taken literally, abilities to "read" and "write" visual messages must involve sequence. Non-sequential, simultaneous, or unitary instances of perception and information processing do occur in human experience, and those instances are generally visual experiences, as in recognition of an acquaintance's face. Visual perception and the qualities of individual images are also an important part of visual literacy theory.

Two assumptions of the authors are implicit in the above: 1) that visual literacy concerns are centrally those of human capability, particularly those capabilities which are enabled by language and the visual experience, and 2) that the media with which most people involved in visual literacy work are typically motion picture film, still photo technologies, video, and the visual arts through drawing, painting, and other art media. It is our experience that for most members of IVLA, using computers for visual work is not as common as using the more established media. Actually, we put it too softly; many of our cohorts in this visual literacy business express real puzzlement over using computers at all in our area. We have heard, over the past two years at IVLA meetings such statements as, "Well, I understand that computers are great, and I use one at home for word processing, but I am an art teacher and frankly don't think the graphic capabilities of personal computers available now are good enough to be worth messing with right now." Another common sentiment is, "Well, to be honest, computers put me off. I don't know what all the shouting is about, and I really don't think I have 'that kind of mind' anyway."

It is the purpose of this presentation to approach both what microcomputers can do in the way of graphics and to tie those capabilities with visual literacy theory. Very little of what we will do in the next few minutes of demonstration can be conveyed in this written document. On the other hand, a great deal of what we have to say about ties to visual literacy will appear in the second section of this paper.

## DEMONSTRATIONS

We will use an Apple II computer with various peripherals (attachments) and software to illustrate capabilities. The Apple is ideal for such illustration for a number of reasons:

1. The Apple II is a very commonplace computer in schools. Although not universal, seeing what an Apple can do touches more of us than any other single computer we could choose at present.
2. The Apple II is not particularly advanced or special in the amount of visual detail which its graphic capabilities can provide, among those computers that have any graphic capabilities at all. In other words, if you are at all intrigued by the potential of what we show, you may be pleasantly surprised by the capabilities of other personal and small business computers, particularly those computers which are not yet manufactured but anticipated within the next year or two.
3. The Apple II is special with regard to the amount, quality, and price of software and peripherals for graphics work available for it. We can show a greater variety of the sorts of things a computer can do with an Apple than we could with any other microcomputer.

Two questions underlying that which our demonstration of microcomputer graphics seeks to answer and illustrate are:

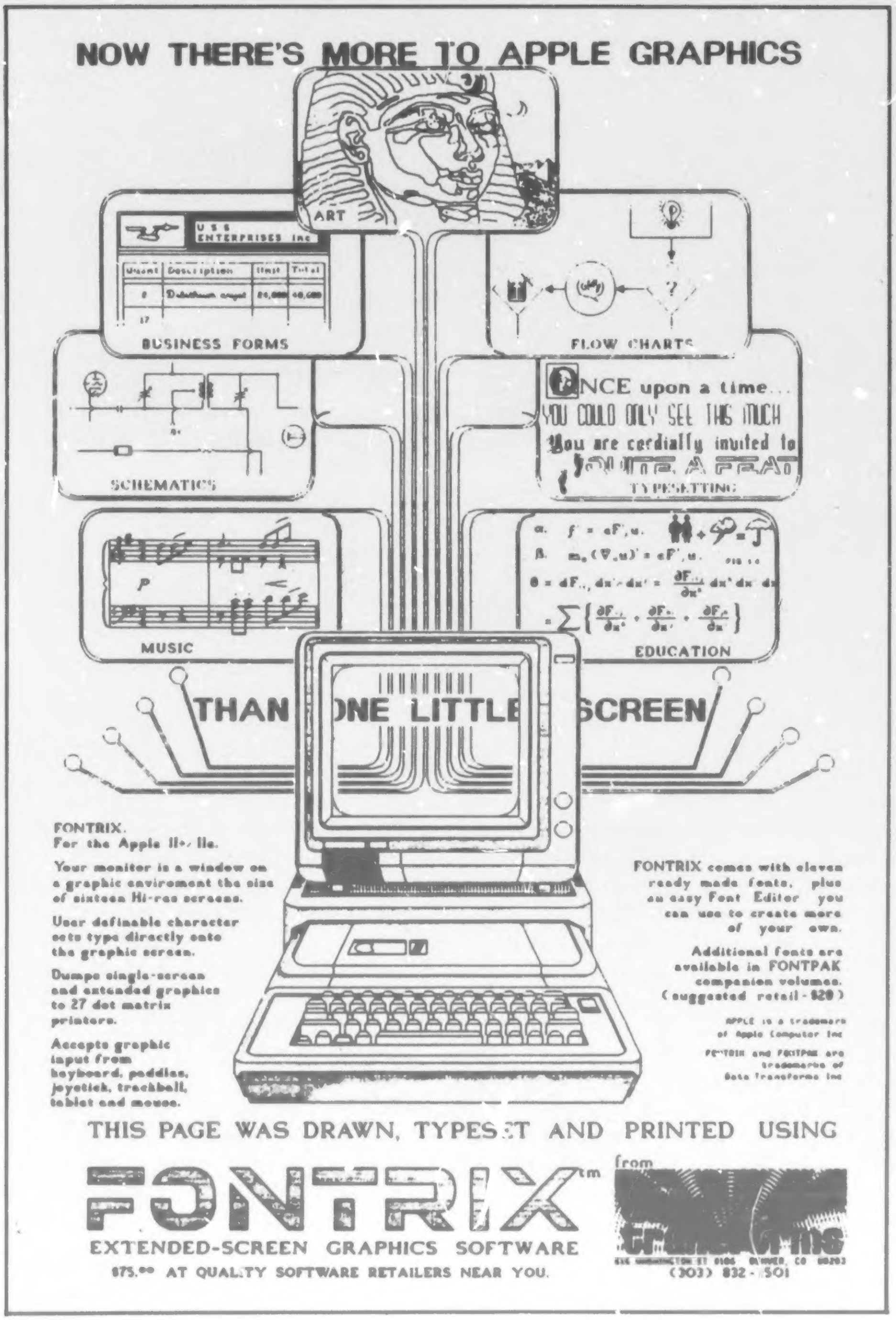
1. Why would anybody do graphics on a microcomputer?
2. How can you do either graphics or art on a microcomputer? What do you use and what does it come out looking like?

WHY COMPUTER GRAPHICS? Computer graphics can be used as either a tool or as an element within other forms of computer use. In the world of work, people use computer graphics as a tool because it is easier and faster than doing the work by hand or with assistance from conventional mechanical aids such as lettering devices, air brushes, and so forth. Tool-based computer graphics work in some instances enables design work not feasible by any other means. Tool-oriented computer graphics applications are exemplified by computer aided design (CAD). The potential offered by CAD is a substantial subject in and of itself, but suffice it to say at this point that CAD enables fast and precise translation of specifications into both conceptual and working visuals for manufacture of individual parts and whole assemblies of such complex things as cars, aircraft, and buildings. Although little use is made of computers as small and inexpensive as Apples in industrial CAD, Apples and no doubt other equivalent personal computers are used frequently in training people to do CAD since the primary difference between the Apple's CAD capability and that of the bigger computers lies in the area of speed. And, with the proper software and equipment, an Apple is quite capable of "personal CAD" in a home, business, or education.

Computers are also employed in advertising and instructional materials production for such diverse graphic arts tasks as type font generation, type setting, composition, graphic image generation, and image enhancement and manipulation. For network broadcast television, book publishing, and magazine advertisements, such work is typically handled by relatively expensive computers, many of them specially designed and made for particular graphics applications. However, microcomputers such as Apples are in fact used for the same sorts of jobs in advertising and in instructional graphics preparation. The primary differences between an Apple and a $200,000 graphic arts computer are in speed and amount of resolution possible, and in many instances, resolution can be made to far exceed that which is usually anticipated by using software which trades off speed for increased resolution (see Figure 1).

In addition to tool-based applications, computer graphics may be employed as an Element within other forms of computer use. In addition to very familiar applications of this sort in arcade games, graphics are frequently employed in computer assisted instruction (CAI). Since video display is generally employed in CAI, the detail possible is not as great as when a plotter or printer is used. However, the flexibility offered by computer graphics can more than offset image detail limitations for many applications. In addition to simple still visuals, computer graphics can employ movement, either simple movements or full animation. Computer generated three-dimensional graphics and 3-D graphic animation put to instructional use can be a powerful tool in such applications as flight simulators. A unique attribute of computer graphics is seen when computer graphics are employed in interactive materials. In such cases, such as a flight simulator program, what happens on the screen is dependent upon what the learner does. The power of arcade games to fascinate and hold attention can be and is being put to use for learning.

A third category of computer graphics application can be seen in computer art. In the world of art, people use computers because, well, computers can make images. Anything that can make an image is fair game for art. Computer art is perhaps a dangerous topic for the authors due to our own lack of credentials in this area. At risk of offending computer artists among our audience, however, we might note that computer art does not seem to have reached any sort of maturity as a form or medium. If this is in fact the case, it may be so because computers are new and zippy. Certain artistic pitfalls for computer artists may be harder to avoid than for those people working with oils, clay, and water colors. The pitfalls which accompany newness and zippiness should be most familiar to those who work as artists with photography and video. All of which is to suggest that the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ONCE upon a time...
YOU COULD ONLY SEE THIS MUCH
You are cordially invited to
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MUSIC
EDUCATION
THAN ONE LITTLE SCREEN
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FONTRIX™
from
Data Transforms
EXTENDED-SCREEN GRAPHICS SOFTWARE

FONTRIX.
For the Apple II+, IIe.

Your monitor is a window on a graphic enviroment the size of sixteen Hi-res screens.

User definable character sets type directly onto the graphic screen.

Dumps single-screen and extended graphics to 27 dot matrix printers.

Accepts graphic input from keyboard, paddles, joystick, trackball, tablet and mouse.

FONTRIX comes with eleven ready made fonts, plus an easy Font Editor you can use to create more of your own.

Additional fonts are available in FONTPAK companion volumes. (suggested retail - $20)

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Figure 1. Advertisement for "Fontrix," software for Apple II computers by Data Transforms, Softalk, November, 1983. p.96. (Used by permission.)

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artistic potential of a medium is difficult to assess during the infancy of that medium's use by artists and during the infancy of a public's learning to appreciate and respond to work in a new medium.

VISUAL LITERACY THEORY

In the introductory paragraphs of this paper, we spoke for simplicity's sake of visual literacy theory as if it were a unitary, single-minded body of thought. There is, of course, no such thing. "Visual Literacy" means a variety of different things to different people and may mean a variety of things to one person, depending on context. The term "literacy" itself is rich with various meanings, all potentially appropriate to varieties of contexts in which the word may be used. Among the various ways in which visual literacy may be viewed, there is one divergence in thinking about visual literacy that may be particularly productive to discuss here as we begin to think about the relevance of computer graphics to visual literacy.

Two ways of looking at what visual literacy proposes to do are orientations which we will call the "*Idealist*" and the "*Practical*." The idealist view is that which relates visual literacy to a building of learner abilities which can, it is theorized, make people more able in problem solving, communication, and thinking. Like the goals of traditional liberal education, the goals of visual literacy may be seen to center on improving the quality of life, through broad and global effects of improvements in a person's communication and problem solving abilities, certain knowledges, values, appreciations, and cultivated tastes. The Idealist orientation is not tied to preparation for any particular job or field of endeavor.

The Practical orientation to visual literacy is evident when we emphasize the ubiquity of visual communication in modern life. The assumption, explicitly or implicitly made, is that with visual literacy skills, our graduates can get better jobs or do better at the jobs they have because of the relevance of visual communication and problem solving skills.

One finds the relevance of computer graphics to visual literacy in both the Practical and Idealist orientations.

PRACTICAL. It should be evident from the variety of examples shown earlier that computers, even home use or personal computers, are capable of being of real assistance to a communicator. Knowledge and proficiency with computer graphics is a skill of increasing practical importance. Such knowledge and proficiency may well be considered as a "literacy."

The term "computer literacy" is perhaps an irritatingly familiar one to those of us concerned with visual literacy. If it were a contest, we hope you realize who has already won. Fortunately, it is not a contest (at least not in its entirety). Before explaining how we see little conflict between computer literacy and visual literacy, we should note that some views of computer literacy, in our opinion, are not worth worrying about, being trivial, "educationized," book-learning about computers. Real computer literacy is and comes from hands-on work with computers, becoming able to employ computers as thinking, communication, and problem solving tools.

To whatever extent graphics skills are learned and put to use in computer literacy, we would suggest that visual literacy is being taught. It seems to us that the greatest impact yet to be seen in the near future on learner's visual literacy will come through the modality of computers. The primary reasons for learning computer graphics skills will be rooted in the practical: computers save time in creating visuals, and computers offer a uniqueness of product that in many instances is that which a problem of design can benefit from most. Children will be learning computer graphics for the same reason they learn word processing: the speed, support, and flexibility which the computer offers liberates the mind like a bicycle liberates the body, i.e., not entirely, but to an important extent. (Note: computers as "bicycles of the mind" is a concept first expressed by Stephen Wozniak, developer of the Apple II.)

IDEALIST. The most widely acknowledged and publicized high quality educational application of computers in recent years has been LOGO, a computer language for children. The first and primary contact most learners have with LOGO is its "Turtle Graphics" capability. Everyone involved with visual literacy should read Seymour Papert's book, Mindstorms, as a minimal beginning introduction to the educational potential offered to children's minds by working with computers in general and computer graphics in particular. Papert, a central figure in the development of the LOGO language, is now its principal spokesperson for educational potential. Papert speaks from a neo-Piagetian perspective, which is not a perspective shared by this paper's authors. Despite a rather wide theoretic gulf between Papert's theoretic base and our own, we find tremendous educational significance in his ideas.

Like the visual literacy proponent, one of Papert's primary metaphors is that of language. When speaking of reasons for children's typically mediocre progress in mathematics, one of Papert's favorite analogies is between learning mathematics and learning a foreign language. When languages are taught as foreign, they typically remain foreign. To learn French, Papert suggests, it is ideal to go to France and speak French with the French people, day to day. Likewise, to learn mathematics, one should ideally be able to go to "Mathland," interacting with entities who think in the language called Mathematics. Computers are eminently suited to the role of being entities which think Mathematics, and the computer language, LOGO, was designed as an intermediary between children and computers so they can "talk math" with each other. Interestingly, verbal/visual exchanges are what is primarily involved in these conversations among children and computers. The child creates verbal utterances which are commmands to the computer and the computer replies with graphic depiction of what the child said. Although concrete on the surface, a great deal of abstract reasoning is involved when a child makes the Turtle draw increasingly complex patterns and pictures on a video screen. (Note: those reading this paper without having either attended the accompanying presentation or previously having worked with LOGO must arrange to work first hand with LOGO before having any chance whatsoever to comprehend the nature or significance of that which is being discussed here.)

LOGO is not the only way to work on higher order cognitive abilities through computer graphics. Extended versions of the language BASIC, which comes with home and personal computers such as those made by Apple, Atari Commodore, IBM, and Texas Instruments, allow the same sort of visual/verbal dialogue between learners and computers as does LOGO. Actually, the demonstration of Turtle Graphics accompanying this presentation was written by David Krathwohl in BASIC to emulate components of LOGO. Although the details of the two languages are different, and it must be said that LOGO is a more elegant and appropriate language for learners to learn mathematics and computer programming, interactive writing of instruction sets for graphic displays using BASIC and viewing their result on a video screen involves the same essential qualities as working with LOGO. Discussions of those essential qualities have employed various terms and concepts, but something is in common with all. Terms and concepts used in such discussions include: iteration, sequence, juggling, algorithmization, manipulation of variables, and transformations.

What are all those terms talking about? Just as the excitement over the outcomes of students making their own films in an English class is a little hard for most people who have not participated in such experiences to understand or appreciate, the "magic" of communicating with a computer is a difficult thing to describe to those who have not done it. But theory development requires that we at least try to describe and explain what we think is going on, leading to research which may confirm or fail to confirm our notions of what we think is going on.

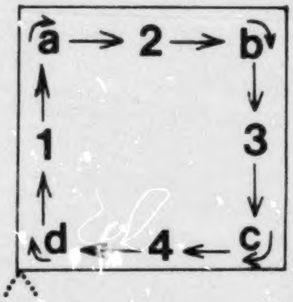
It is important to realize that in the present discussion of computer graphics for learning, we are talking about student contact with computer graphics which is analogous in the medium of motion pictures to *creation* of messages using film. Just as the usual use of a 16mm classroom film on Shakespeare's England is not at the core of what we mean by "visual literacy," the use of computer assisted instruction materials on the same topic is neither visual literacy nor what we are talking about here. For us to analyze the film for its message and message design attributes and for us to learn and apply our learning of message design in creation of a film *is* analogous to our using a computer to develop our own images and statements. The analogy extends to quality considerations of the product made by either the English class making films or the (????) class making computer images. Although all of us encourage and hope for "good work" we don't anticipate that many of the short films made by our students will have broad popular appeal in the nation's movie theatres and perhaps little appeal outside the classroom itself (except perhaps with relatives). Nor should you anticipate that a visual made by a child working with LOGO or BASIC will be particularly impressive as an image. In both the film and the computer work, what the student learned is the central concern.

## SEQUENCE, TRANSFORMATIONS, & JUGGLING: AN EXAMPLE

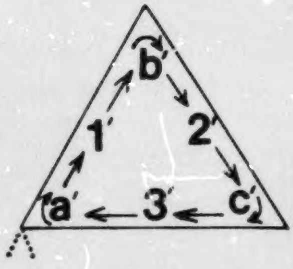
A child is working with the Turtle Graphics aspect of LOGO. Let's say the child wants Turtle to draw a simple house figure. Using the Turtle command to draw (>), she tells it "> HOUSE", to which the Turtle responds "I DON'T KNOW HOW TO > HOUSE. PLEASE TELL ME."

Now the child must determine what she wants a "house" to consist of. A house could be a square with a triangle on top.

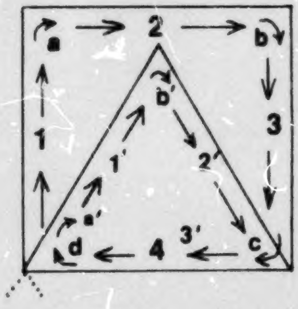
What is a square? A square is a sequence of four lines of equal length connected at right angles. How do I draw a square? Draw a line, turn 90 degrees to the right, repeat this four times. The child tells the Turtle to "DO 4 (FD 40.RT 90)" to draw SQUARE. The Turtle will now remember how to draw a SQUARE.



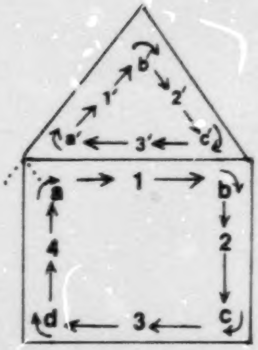
She then follows the same sequential process to teach the Turtle how to draw a TRIANGLE: DO 3 (RT 30.FD 40.RT 90).



It is simple to tell the Turtle how to transform the TRIANGLE and SQUARE into a HOUSE, thinks the student. I will just tell the computer to >SQUARE..TRIANGLE for HOUSE. The only problem is, following the commands as given, the Turtle draws:



This calls for some rethinking to get the TRIANGLE on top of the SQUARE. She might first think of having the Turtle redraw the first leg of the square as "DO5(FD40.RT90)" in which case she would find that the house is too tall for the Turtle's screen when the display returns the message, "THE TURTLE WOULD BE OUT OF BOUNDS." She might then juggle her thinking around to draw the square differently, as in: DO4(RT90.FD40). When she has the Turtle draw the box that way, then upon >HOUSE, the turtle draws:



Verbalizing the thinking in which a child might engage to make the Turtle draw a house, both successes and dead-ends, may make the process under description seem trivial. If so to the reader, a few realities should be considered: 1. the processes described above begin as abstract, relational thinking on the child's part, and 2. the example given is a simple example, only superficially illustrative of the point. Frequent users of LOGO, whether children or adults, rapidly advance to much more complex applications of the language and to heightened levels of creativity.

## CONCLUSION

This paper has sought to outline salient points of microcomputer graphic capabilities and relate those capabilities to visual literacy thinking. In so doing, we hope to have presented information of interest to those who may have limited experience with computer graphics and to have expanded and clarified the domain of visual literacy in a new and increasingly important arena of application.

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# VISUAL TECHNOLOGY AND THE DEVELOPMENT OF ACTIVE VISUAL LEARNING

by

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Technology has always been a driving force of literacy, whether verbal or visual. The development of literacy skills by a majority of any population is specifically dependent on technology. The improvements in literacy technology seem to focus on two factors: making it easier to create and to transport messages. The printing press was one of the major factors in the spread of verbal literacy in the Western cultures. Gutenberg's printing press simplified reproduction of information, and thus messages could be transported more easily as well. Other technologies provided similar improvements for verbal literacy, from the original development of paper and writing tools, to typewriters, teletypes, xerographic copiers, and word processors.

A review of the development of technologies related to visual literacy will show a similar pattern. Of course humans have been creating visual line drawings with crude tools since prehistoric times. Other than a few developments with the tools for creating art, technology provided few improvements related to the visualization skills for the total population.

Not until the printing press began mass reproduction of line drawings did technology begin to dramatically affect the visual skills requirements of a large portion of the population. A major change occurred with the creation of photography as a method of selecting and controlling visual images using various techniques. This medium was not used only by expert "artists" of photography but became a tool for a large portion of the population with the development of smaller and simpler cameras. Then came the development of mass visual media with films and eventually television and home video recorders. Printing presses began reproducing with greater detail and a multitude of colors. The capacity for large numbers of people to reproduce visuals arrived with ditto machines and xerographic copiers.

Within the last ten years the electronic technologies have begun to create tools which not only reproduce visuals but which allow for the creation and the control of visual forms. These new developments are affecting not only what the general public learns from looking at visuals, but how they will eventually communicate, learn, and think with visuals. In the past only a small portion of the population was able to create their messages visually in order to communicate their visual ideas to others.

Microchip technologies are providing a means for the average person to not only receive visual messages but to actually control and create visual messages. The people in our society will soon transform from visual viewers to active visual learners because of developments in technology.

## VISUAL TECHNOLOGY--THE NEW EQUIPMENT FOR INSTRUCTION

At this time many new types of equipment are beginning to flood the educational technology field. By far the most impressive applications for visuals in education are coming from microcomputers and videodisc players controlled by computers. This article will only focus on microcomputer applications, but educators need to seriously consider the impact of videodisc systems as they become more available in the near future. Computers with more power and memory are daily becoming available at cheaper costs for educational applications. For the educator interested in visual learning it is important to realize that more powerful computers with more memory means more access to visuals.

At the same time that the computer engineers were developing power and space for more use of visuals, new equipment and computer software was being designed for "programming" visuals into programs. Graphics tablets (costing less than one hundred dollars) have been designed to the point where a novice computer user can create colored images on the computer screen by drawing on an electronic pad. Once the image is designed, it can be stored and accessed for display in any program. Light pens have been created which allow the student to draw or select items directly on the monitor, and voice synthesizers are now capable of easily reproducing the spoken word. When combined with visuals, instruction can be designed to eliminate the concern for reading requirements, particularly for special needs students.

## VISUAL TECHNOLOGY AND EDUCATION--THE CURRENT STATUS

### Learners as Viewers

So how is technology changing the use of visuals relative to education? At this time the greatest use of visuals is as it has been since the first use of illustrated textbooks. Students use visuals as a means of receiving information simply by viewing or observing the picture or graphic forms. They can be actively involved in learning from the visual forms, but we do not always know that for sure because this type of learning is internal. Thus, we have to question the students and most often we are asking for either written or oral responses.

Learning by viewing is, of course, useful and valuable. Technology has continued to use various instructional strategies in presenting information including simultaneous presentation of visual and verbal information, visual cueing techniques, and exciting visuals to motivate the learner. The first of these strategies is being used with microcomputers much as it was with traditional instructional media.

Computer programs often provide the learner with visual and verbal information simultaneously. Unfortunately, sometimes the visuals can be distracting, as with a program titled The Revenge of Rumplestiltskin by Book Lures, O'Fallon, MO. This program was designed to encourage students to read the story. At times in the program a half screen of text is presented for the student to read and immediately a drawing of some sort is laboriously drawn on the other half of the screen. Students become so entranced with the picture being drawn they do not bother to read the text. Another program, Meet the Presidents by Versa Computing, Newberry Park, CA, is an example of a program that uses pictures to help students remember information about U. S. presidents. For those students who depend on visual memory, this approach may prove to be helpful. The strategy of presenting visual and verbal information together has been shown to be effective for learning under a variety of conditions (Alesandrini, 1982). However, care must be taken when developing computer software that will take advantage of both forms of information rather than cause interference.

New technologies are providing some new methods for cueing the learner to important information. Compared to print, film and videotape, microcomputers have the capacity to specifically control what is on the screen. Thus, the designer can focus the student's attention to specific details (both visual and verbal) by revealing the information when it is most appropriate. Other types of visual cueing strategies are used for computer programs for either visual or verbal information. Some of these techniques include the use of changing colors, flashing lights, animation, and reverse lettering. Eduware's Algebra series from Agoura Hills, CA, is a program that effectively uses animation to show students where numbers come from when they are "brought down" in division problems. It also uses reverse color lettering to point out areas on a chart being described in the text.

Visuals can be used simply as a motivational tool. This application, however, tends to be the most common and most distracting use of visuals in technological instruction. One poorly designed program penalizes students for doing poorly on a quiz by showing them an animated, colorful fire-breathing dragon. The reward for passing the quiz is a dull, motionless, closed treasure chest. Unfortunately the developers have not consulted the multitude of motivation research which identifies effective use of visuals for presenting information. Various studies on the use of visuals in education are reviewed and summarized in Dwyer's Strategies for Improving Visual Learning (1978). This source only touches the surface of the needed visual research and does not attempt to consider visual applications in computer instruction.

## Layout

Before I progress to the next use of visual instruction provided by technology, it is important to mention layout of information being presented to students. With the use of video screens for a large majority of the new technology, there are a number of issues which visual design research can address. Many of these issues will concern the amount of information provided, the use of white space and borders, and the size, shape, and detail of the images. These factors can be extremely important even for the design of word processors and other primarily verbal programs. A comparison of the Bank Street Writer microcomputer program by Scholastic, New York, NY, with many of the major business word processors will demonstrate the value of careful layout design. Bank Street Writer is a word processor for school age students which uses large letters, a menu which is always on the screen, and a distinctive border to discriminate between the text and the commands. Whenever critiquing any new type of communications technology, the layout must always be a primary issue. I will not attempt to identify all of the effective strategies for layout design. A great deal of research can be consulted to provide layout guidelines.

## Learners as Creators

Earlier I described the traditional use of visuals in instruction as primarily for learners to observe graphic information. The other end of the continuum for use of visuals is to provide students with the materials to create their own visuals. It seems that this instructional strategy is used less as the students advance in grades. Coloring and painting are traditionally taught in art throughout school, but how often after the sixth or seventh grades are students asked to draw to communicate their understanding of a concept? Even in courses such as geometry and map reading in social studies where drawing is crucial, most students are provided with the visuals and asked verbal questions about them. This is not to say that visual literacy is not being taught, but obviously it has not been integrated into the regular curriculum. In most cases where visual literacy is taught, it is organized as a separate subject from other academic programs (Dake, 1981).

New technologies are beginning to provide an opportunity for students to create their images by use of computer graphics. The graphics tablet described earlier is the best example of what is now available. Other applications will soon be developed which will ask students to communicate their understanding of a concept by drawing a complete musical staff, a geometric design, or a predication on a statistical graph.

Currently, teaching computer programming in order to produce visuals has been a useful strategy in the math curriculum. The instruction of Logo, a comparatively simple computer language, is being used to teach students the relationship between mathematical functions and the images produced when those functions are entered into the computer. Many teachers of elementary children are convinced that the students gain a better understanding of math problem solving while directing the computer to create visual images. A side benefit is that the students learn a computer language as well.

Other similar programs are available for students to create their own images using joysticks as in video arcade programs, or actually using the computer keyboard to direct a cursor which can "paint" on the screen. Although the strategy for students to create their own images on technology equipment is not yet very advanced, it is only in its infancy. With the development of faster, more detailed, and easier methods to draw and to transport student created images, this application of visuals in education will surely expand.

## Learners as Controllers

In the previous sections of this paper I discussed the two extremes of a continuum for student use of visuals in learning: visuals used to provide the learner with information and to provide the students with a method of creating visuals to communicate their understanding. I will now move back to the middle of the continuum where I believe technology will provide its greatest effect on the use of visuals in our society, and especially in instruction. In the middle of this continuum (See Figure 1) is the instructional strategy where students control predesigned visuals in order to learn a concept or to communicate their understanding of a concept.

This is where technology has made an impact and will be making an even greater difference in the use of visuals. Other than manipulating some models or a few pieces of scientific equipment, or taking photographs in a few specialized classes, students have rarely been able to control visuals in order to communicate their understanding. Until the development of microcomputers in education, the most common use of this strategy was primarily found in the video arcades! People have been amazed at the popularity of video arcades and now the home video games. However, when you realize that this is the first time a generation has had the opportunity to control specific elements of a visual image, it is not all that surprising.

With recent refinements in computer programming and equipment, educational computer programs are just now beginning to use the instructional strategy which allows students to manipulate predesigned visuals. Having reviewed many of these types of computer programs, I have identified three major applications for student control of visuals: to control the sequence of the program by manipulating the graphics on the screen, to control the progress of a visual design by entering data, or to control the placement of visuals to communicate or explain relationships. All three of these applications are valuable, but not all computer programs use these applications effectively.

A popular "educational" program on the market today is Snooper Troops Case #1 by Spinnaker of Cambridge, MA. The program is designed to help children solve a mystery in order to learn to take notes, draw maps, and classify and organize information. The use of visuals in this program is to control the

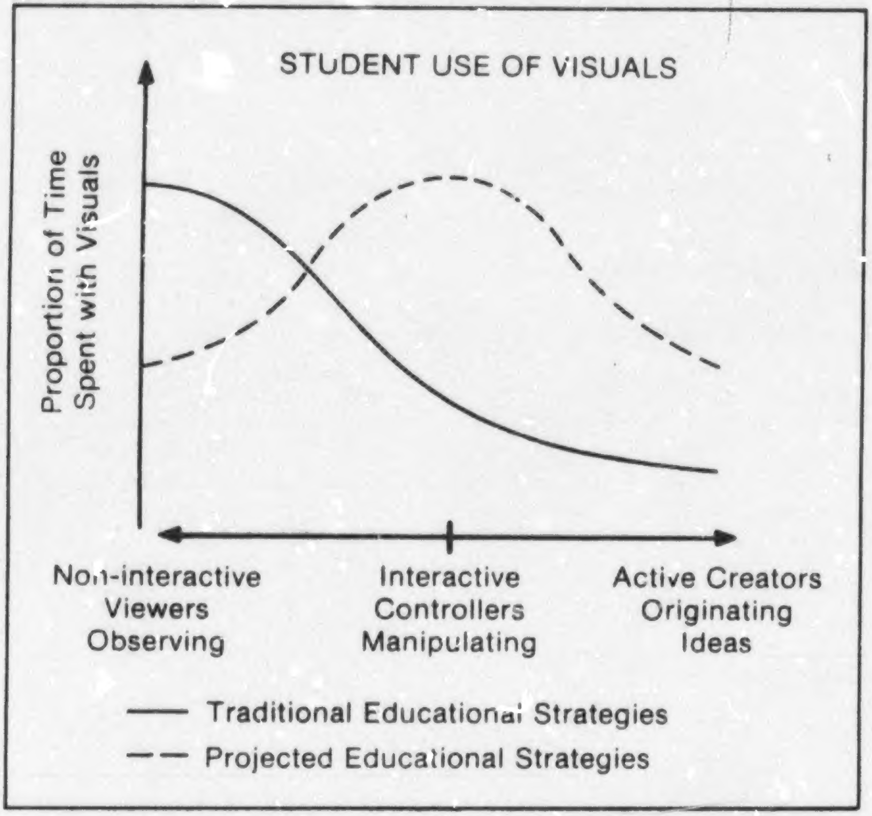

Figure 1. A continuum of student use of visuals with an estimated graph depicting the projected and traditional strategies for each type of use of visuals for instruction.

sequence of the program. The instructional goals are very useful and well presented, but the method of gathering information involves moving a detective and his car around the screen to different locations. It takes a great deal of time for children or adults to learn to coordinate the computer keyboard keys which control the movement of the visuals in this program. Keeping in mind that the average child will have access to a computer for about 15 minutes per week, the student ends up spending most of that time learning the manipulation of the motivational visuals. By the time the students are effective at directing the visuals, they do not even care about the instructional problem.

Some computer programs which effectively use the control of visuals to sequence the instruction are those produced by The Learning Company of Menlo Park, CA. Programs such as Gertrude's Secrets, Gertrude's Puzzles, and Rocky's Boots have menus of program options which are actually mazes of rooms with doorways to different parts of the program (See Figure 2). By moving a cursor from one room to another, the student directs the sequence of the program using a joystick.

The strategy for entering data to control visuals on the computer screen appears to be quite effective in a number of computer programs, particularly in the area of science. The Millikan Oil Drop experiment by Mentor Software, Anoka, MN, is a technical science experiment requiring a great deal of equipment when performed in the chemistry classroom. By using graphics on the computer, the student is provided with a simulation of the equipment. The student enters data to change the speed of falling drops of oil. Once the correct values are entered, the oil drops become suspended. The computer program allows the student to quickly observe the experiment and effectively learn the concept with less time and cost.

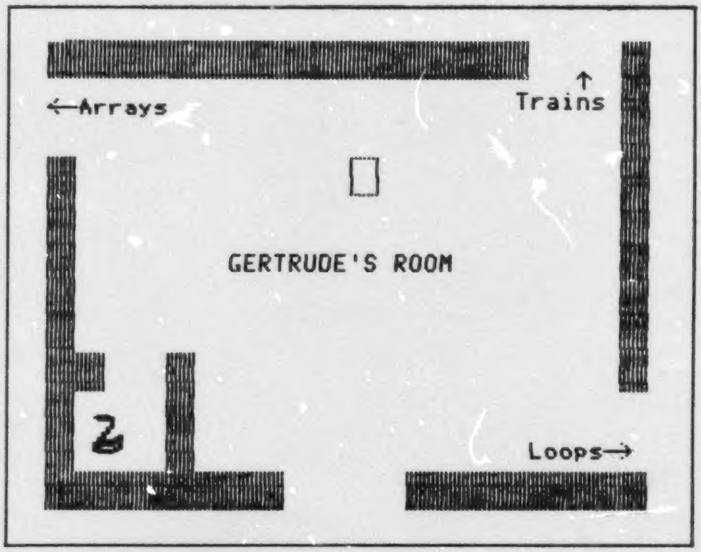

Figure 2. A visual menu from the computer program Gertrude's Secrets. The rectangle in the center is the cursor which the students use to move the goose from room to room to select the desired activity. (Graphic by permission of The Learning Company, Menlo Park, CA).

The program Catlab by Conduit of Iowa City, IA, provides a study of genetics by quickly showing the offspring of specific types of cats mated in various combinations. Students identify the type of cats being mated and the computer visually illustrates the offspring much faster and far more easily than can be done with actual cats. These are just a few examples where data of various types can be used to control and learn with visual feedback.

One instructional approach using student control of visuals is closely related to the direct visual feedback found in video arcade games. With this application students directly control the visual images on the screen in order to communicate their understanding of a concept.

For examples, I go back to the programs developed by The Learning Company which not only have visualized menus as described earlier, but also teach various skills using visual forms. Gertrude's Secrets is designed to teach categorization skills and primary concepts of set theory. In the program, the students use a cursor controlled by a joystick to move shapes around the screen. For categorization skills, the students place shapes onto a 3 x 3 or 4 x 4 matrix using color and shape for each row and/or column category. If the shape belongs in the position identified by the student, it stays there. If it does not belong in the square, the shape falls to the bottom of the screen. Similar strategies are used to teach set theory by using two overlapping squares (a Venn diagram). Students move shapes on the screen to determine the category for each square and the overlapping section of the squares. (See Figure 3)

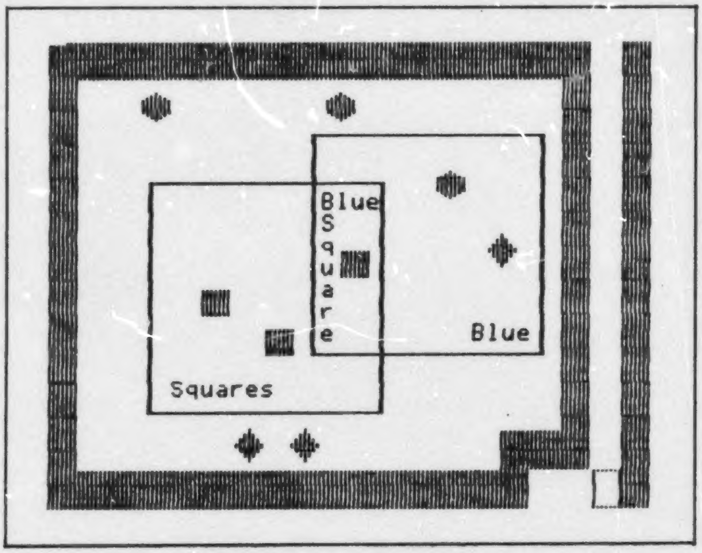

Figure 3. A visual classification task from Gertrude's Secrets. The words are added to this design as an example. The students must figure out the appropriate colors and shapes in the actual program. (Graphic by permission of The Learning Company, Menlo Park, CA).

Rocky's Boots teaches students simple electronics, computer programming and logic skills such as the concepts "and", "not", and "or". In this program the students use the cursor to move pieces of simple machines to create a machine. When designed properly, the machine will cause Rocky's boot to kick out the appropriate colors and designs from a stream of shapes. Later more complex machines can be developed and advanced students can even create their own machines. These types of applications illustrate the best use of visuals for learning concepts through methods only available on computers. It must be mentioned here, however, that it will be crucial to transfer these concepts to realistic situations in order to make them useful.

## VISUAL TECHNOLOGY--IMPLICATIONS FOR RESEARCH AND LEARNING

Having analyzed some of the applications for visuals in microcomputer assisted instruction, it becomes obvious that this new technology has expanded the capabilities for students to manipulate visual forms to learn or to communicate their understanding of concepts. At this time there is very little research to support the value of using these instructional strategies. Part of the problem with visual literacy research may have been the difficulty students find in trying to communicate visually, even though they may be thinking visually. It appears that the new technologies are now providing a means for students to overcome these problems. We should now be able to use these technologies to better research the use of visuals in learning.

This article has outlined some areas which need to be studied in detail: the use of visuals when presenting information with sequencing and cueing techniques; the use of students creating visuals as their means of communication; and, most importantly, the computer application of predesigned visuals manipulated by students. Computer technology is beginning to ask some pertinent questions about these issues. What will be the effects on the educational process of students' active control of visuals? What areas of the curriculum can for the first time take advantage of visual learning because of the expanded versatility of computer graphics? What types of students will find the control and creation of visuals more useful for their learning? What instructional approaches will educators have to adapt to take advantage of these capabilities?

Although the research has not yet answered these questions, classroom experiences with the techniques described in this article are showing positive results. Those visually oriented students who have long been neglected by our primarily verbal educational system can for the first time express their ideas and abilities. Special education teachers have been quick to realize the potential of the computer as an effective tool for students to communicate visually. Other classroom teachers are now seeing the same possibilities for visualizing what has traditionally been totally verbal instruction.

Educators are becoming more aware of the need to design and apply visuals carefully in computer instruction. It appears that the misuses of visuals in computer instruction are more obvious than in traditional instruction because the computer immediately discloses the students' misinterpretations from their next responses. Often in the classroom these misinterpretations were difficult to identify. As a result, producers of computer programs will need to consult with visually literate instructional designers to take careful advantage of the graphic capabilities of computer assisted instruction.

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# ENHANCING HUMAN POTENTIAL THROUGH PHOTOTHERAPY

An introductory overview and a chronological history of the emerging field of phototherapy is presented by Weiser in her informative discussion of the use of photographic imagery to enhance communication between client and therapist.

One such application is described by Krauss, who includes the use of instant photographs as well as family albums to enhance diet awareness and to aid in changing client behavior, thinking, and attitudes.

Walker brings the Readings to a close by citing five examples from his work with institutionalized elderly persons who have been helped to develop self-esteem and express their human personality through participation in a photography group.

Truly our eyes have been opened, our minds have been stretched, and we look forward to the 1984 conference with a heightened sense of expectation.

# PHOTOTHERAPY--BECOMING VISUALLY LITERATE ABOUT ONESELF

by

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In any rapidly developing field it is hard enough keeping up with the exponentially exploding information base, much less continually pausing to introduce the field to newcomers who appear with increasing regularity, asking, trustingly, "could you please tell me what this is all about??"

And so it has also been for PhotoTherapy. Most of the dozen or so major practitioners and researchers active in North America these days formed their loosely structured association with each other during the past five years, most being originally connected during the first symposium in Illinois in 1978. The rest have strengthened the reinforcements through initial contact with one of the early core group, usually with an icebreaking enquiry such as, "I'm using photography in my counseling work with clients, and so-and-so said I should get in touch with you because you do too, and maybe we could share info."

This inevitably led to an enthusiastic reply bordering upon information overload for the poor recipient who had enquired, in all innocence, simply for some support in their previously not-too-well-received efforts to tie visual and non-verbal communication through photographic imagery to their work as 'people-helpers'. Frequently thinking themselves (with perhaps one or two others) to be the only poor souls exploring these possibilities, they were often close to overwhelmed with the amount of data, techniques, publications, research-learning-practice opportunities, and networks of colleagues across Canada and the U. S. There was almost universally the experience of a trade of emotions (and with it sometimes a bit of a let-down) as the novice exchanged the 'alone-and-a-pioneer' feeling for that of 'welcome to the family; you're not alone, but your interest and input are definitely needed and encouraged!'

Having possessed for a full year the thought that I had myself invented PhotoTherapy (and also invented the actual term from my blending of Deaf Sign Language concepts), I can assure you that it was with great surprise that I received my invitation to the first PhotoTherapy symposium! Thus having been on both sides of this process, I can sympathize deeply with what newcomers often go through. Although I was a bit sad that I wasn't going to be famous for something (or, at least, *this* something), it was a relief to find the basic work already being done, my contributory facet needed, and my enthusiasm welcomed and put immediately to work.

I did, however, need educating to the scope of the field, in the then current semiotics, the structure and framework being used as common language by colleagues, and how to fit my own unique perspective and applications into what already existed. Articles did exist (bless Doug Stewart's heart!) (1), on the actual techniques themselves and a bit of conceptual background, but an overall comprehensive context, and chronological development of the field, as well as the network of other people and their own work, were harder to grasp for the newcomer that I was. Where should I start to go ask whom for what? And how was I to find it out, or to know when all possibilities had been exhausted? What I wanted, really, was a 'beginners' book (or article), to guide me step-by-step through the development of the field so that I could catch up to the others' knowledge.

Although I have not long passed from this early stage into my present role of directing the world's first centre for casework, research, and training in PhotoTherapy, and being one of the only two formal trainers known to our association in the world, I am still resonant to the plight of those newly arrived on the scene. And it is with them in mind that I have prepared this paper--an introductory overview to help people get a feel for what PhotoTherapy is all about, and to help them further access the available literature and networks, without overburdening them with details unnecessary at this early stage--a menu, rather than the entire full-course meal, but nevertheless a way to know what's for dinner and whether they want any!

Central to the techniques of PhotoTherapy is the idea that communication is based on non-verbal (and predominantly visual) messages at least as much as, if not more than, verbal ones. In therapy, people come for help for problems they are not able to deal with on their own resources--wishing to grow or change, wanting to be better understood, to feel better and more confident about themselves, or to more clearly and effectively relate with others. Communication is the underlying principle; it is much more than just the spoken word. Helping by professionals has enlarged to include information from these other-than-verbal channels, and the term 'expressive therapies' is used to describe those ways of working with people in their more visual, emotional, metaphorical, non-verbal, holistic (and more right-brain) domains. Such therapies usually find clients responding in more spontaneous/intuitive and less protected or defended manners.

As one of these expressive ('arts') therapies, PhotoTherapy shares in its conceptual framework the implication that our creative expressions are actually projections of our selves, that we are individually unique, and we perceive, code, store, retrieve, and put forth information in ways that reflect our personal makeup. People wishing to understand and help us would do well to look at our creative output and perceptions to have a fuller picture of who we are 'inside'.

The way to look at PhotoTherapy is to see it as a set of techniques, rather than a conceptual model of therapy--tools one keeps handy as extra ways to do your helping work with a few more flexible alternatives. Thus, no matter how you envision the 'right' way to structure the therapy or counseling process, no matter what direction, school, or teacher-model you come from, these tools can be useful to you as innovations to tap areas of a person you couldn't get to through ordinary dialogue. Thus we in this field would encourage practitioners to be wary of the term "PhotoTherapist", as it would imply that PhotoTherapy is the only thing one does, rather than stressing the flexible combinations of these techniques and their blend with others non-PhotoTherapeutic in the goal of helping people in ways best suited to them.

So, how do you use photography in therapy? Anyone who has taken lots of photos has become aware that the photograph in and of itself has no meaning. Agreed, it documented what the camera was pointed at, but it is perceived by, and given meaning by, the person who took the picture (and those who later view it); the person who chose what was to be framed, and when was the 'right' moment to shoot. In this sense, all photos we take are self portraits, expressions of the conscious and unconscious self, moments of importance chosen for whatever personal reasons to be frozen in time forever, and if deemed successful, kept and treasured as items of value. There are reasons you shoot a particular photo, to hold onto that moment and its associated feelings, and these emotions are re-created as if in present tense each time the photo is re-viewed. The selection processes: what and when to shoot, which to keep from the whole roll, which make it into an album (or shoebox, wallet, wall, refrigerator door, etc.), which are given/kept/framed/ripped up, which are grieved most when lost or destroyed by fire, and why--all these are statements of self, of personal uniqueness, and they stand for us not only to ourselves, but to others who view them.

But then things get more complicated, as all photo-takers have discovered! What you shot (or thought you shot) may not be what you got; what you see and proudly show to others may not be the same meaning they see. Two people can view the same photograph differently and both still be right. As we discuss these interesting unfoldings of meanings around a simple image, we dialogue of ourselves--our perceptions, expectation, values, personal symbols, and we share information about ourselves (and perceptions of others doing the same), and we can usually communicate more fully in doing so.

It is the process of interacting with photographic images, as well as the product of the print itself, that is of interest to therapists; it is the information and emotions revealed almost as by-products to the photographic investigations that provide such incredibly rich value. In a way, PhotoTherapy can be seen as a first cousin to Phenomenology--where meaning perceived is partially created by the process involved in perceiving it!

PhotoTherapy requires no special skill or training in photography itself, neither for the therapist nor the client--all that is required is sufficient age and-or consciousness to realize that the emulsion-covered piece of paper with 'stuff' seen in it is supposed to represent the real world ('reality') that the camera was aimed at the moment the shutter was released. Thus cartridge/instant/'dummy' cameras are fully as useful as Nikons--and 'trained' photographers find that their art and composition and esthetic knowledge is nice, but not particularly useful.

As photo-taking, -posing, and -looking are nearly universal, most people see nothing extraordinary in being asked to bring in, or respond to, photographs or albums or home movies; in fact, the request is usually considered a non-threatening and welcomed break in otherwise mainly verbal routine.

It must be strongly stressed that therapists using PhotoTherapeutic techniques do NOT interpret people's photos for them; the input comes at all times from the client, guided by the therapist's questions. A person's responses and associated feelings are uniquely personal, and no external interpretative criteria can be used to evaluate or judge; there is no 'wrong' way to perceive a photograph. Similarly, a person's responses cannot on their own, indicate any particular problem, or illness--no analytical decisions can be made from singular responses; competent therapists using PhotoTherapy are looking for patterns, consistencies through time and often generations, unusual or symbolic content, and most of all, emotional responses indicating inner feelings which may or may not be conscious. Thus the therapist's primary role is to encourage and support the client's own personal discoveries.

With so many professionals all independently 'inventing' the field of PhotoTheraphy, it is understandable that each would map the territory under exploration differently. The general territory, that of using information gained in the process of taking and looking at photos, as well as the image content itself, as effective tools for helping people--exploring with them how much they can learn about themselves from photos and videos and their reactions to them; these concepts are central to all practitioners using PhotoTherapy techniques. Part of the focus of this paper is to create a basic framework, a 'coat-rack' on which to 'hang' all the various techniques, to more efficiently study PhotoTherapy and its concepts and applications. As stated above, each practitioner organizes this field with a uniquely categorized system; obviously it is my own that follows (and that I teach from), but it is by no means the only way to organize the field. PhotoTherapy is primarily process; photography as a verb as well as a noun, and there is no single right way to view, teach, or use it. It is not a bounded set of rules or steps that must be followed in some specific order or pattern 'or else. . .', nor is it some gimmick-y 'new-therapy-of-the-year-and-sounds-like-it's-from-California'; rather it is an open-ended collection of methods that allow therapists and clients access to previously blocked areas of feelings, thoughts, attitudes, memories, expectations, and so forth, that had been otherwise unavailable through ordinary verbal means of counseling. These adjuncts to therapy are especially useful with those for whom the usual verbal channels of interaction and expression are not available, either physically (such as hearing-impaired, cerebral palsied, autistic, mentally retarded, aphasic, stroke-impaired, etc.), or emotionally or culturally (different languages, traditions, etc.)--though certainly in no way limited to just these specific types. These techniques work equally well for the non-disabled or cultural majority ('normal') as well as overly-verbal and highly over-defensive people. And although these techniques are most often used in professional counseling, their implications are equally exciting and informative for people who may not need therapy, people who are just curious to explore their own inner visual literacy, how much they can learn about themselves and others from photos and reactions/interactions with them.

At the root of most personal and interpersonal difficulties lie the issues of self-image, self-awareness, self-esteem, self confidence, and often, self-acceptance. PhotoTheraphy, through its various techniques involving passive viewing and active shooting of photographs can work toward marked improvement in these areas. Fryrear (2) has attempted a non-evaluative review of existing literature in the field, and has found 11 main categories of concentration, which also can serve as an introduction to the section on techniques: evocation of emotional states, elicitation of verbal behavior, modeling, self-confrontation, mastery of a skill, facilitation of socialization, creativity of expression, diagnostic adjunct to verbal therapies, a form of non-verbal communication from client to therapist, documentation of change, and/or prolongation of certain experiences.

PhotoTherapy usually means one or more of the following: projectives, historical/album/photobiographical, photos taken by the client/assignments; photos of the client by others, self-portraits, video, darkroom work, and secondary applications such as communications and proxemics research, cross-cultural/ethnic literacy, classroom applications, etc.

Projectives: Viewing photos usually results in some sort of response--feelings, memories recalled, thoughts about the subject content. Similar to the Rorschach or Thematic Aperception Tests, projective work makes use of those differences that make a difference to each person; that what is seen as relevant, or chosen to respond to in viewing any photographic image says more about that person than the subject content of the print. It is human nature to try to make sense out of things; the way people look at photographs reflects the way they feel; it is these feelings that influence the way an image is perceived. (3) One can place oneself in the photo, to explore alternative possibilities, consider options in the role of photographer, project emotions and 'scripts' onto the image coming from one's own life. Appreciation for individual differences and differentness increases as one finds more than one 'correct' way to interpret the same image, and begins to apply these concepts to other parts of life, beginning to accept others' perceptions and feelings as equally valid and improving communication as a result. Projective work applies to past information as well as present perception, and can also be used in fantasy or future-oriented work.

Historical/album/photobiographical: Often, long-buried and well-defended emotions will respond less guardedly to a visual image; photos can reconnect one with memories of past events, people, places, times. Family photos document permanence and change, continuity and existence over time, and give insights to the full system of several generations, relationships, and networks--to see one's self and one's context and thus better appreciate current situations and feelings. As most people are used to taking photos, most families commonly keep some record of their existence. This may be in a naturally evolving manner, or focused toward the goals of some family 'historian'. Album work uses any number of sources of photo-biographical material, including assignments to construct an album along an assigned theme, or to re-construct by finding photos or posing new ones to resemble images in the mind.

Through photographs, each family constructs a portrait-chronical of itself--a portable kit of images that bears witness to its connectedness. (4) Therapists who work within a 'systems' model find album work especially fruitful in material to study multi-generational transmission patterns, triangulation, scapegoating, differentiation/fusion, etc.--it is all there for the enquiring eye to see and base questions on. These, and all other therapists as well, find that to best understand the functioning of the total family unit, one would want to pay attention to the patterns of relationships and interactions among the components--each part or person, how it relates to the others, and to the whole.

In understanding family emotional systems and processes, therapists using the album techniques of PhotoTherapy are interested in addressing the question of what it means to be a person, a woman, a man, a child in this particular family. Photographs are of prime importance not only for the individuals depicted in the photographs, but for their relevance for the family as a whole. They function to call attention to important events in the life cycle ceremonies, rituals, and traditions which are important for the development of the 'identity' of the person involved, as well as indicating the relevance of the event for the development of the whole family, for the 'family identity'. They are links from the family's past to the present, and an affirmation of the traditions and ideals for the future. They serve as landmarks for a history of continuity and change within the multigenerational family picture. (5)

Photos can be used as resources in the true sense of the word: re-source-ing the good times, pleasant feelings, and client strengths and abilities, especially in times of stress or crisis where those memories may not seem as accessible, where they can be used to offer hope, perspective of time past the crisis, of continuity from past to future where one might again re-access those feelings and accomplishments. Similarly, they can be used to help correct distortions and misrepresentations, as they are an undeniable record of the past that no amount of verbal filtering can cover up. Talking about photos with one's family is not only reminiscing and showing previous memories and relationships, but also develops renewed relationships in the present, helping to spread awareness beyond the usually stereotypically perceived roles. While pictures cannot predict the future, they may suggest changes which are operating in the family relationship process which may surface in some form in the future. They can be, at least, indicators of the emotional climate in the family. (6)

Photos Taken By the Client/Assignments: What people choose to photograph (and why) are those things that are important, and make a difference, to them, whether it is for having a memory-record of the scene, or because the photo 'speaks' to them in other ways; at the same time photos reflect people's values, beliefs, interests, social outlook, and responses to the environment, consistent themes, personal metaphors and symbols. Valuable information can be gleaned by a therapist exploring a client's photos with them, either photos already existing and brought in, or those taken as assignments given to construct certain projects (for tighter definition of areas of concern to concentrate on and explore more fully, or more open-ended creative explorations which still provide personal insight).

As one simplifies by placing a frame around things, one can slow the busy world around oneself down into manageable segments, stilling them for deeper analysis; and a therapist can learn much by skillfully observing how and why an individual chooses to select certain photographic solutions to meet personal 'requirements' and asking related questions. (7) If the therapist and client are discussing ('at arms length') photographs taken by the client, it is less threatening, safer, asking more in the third-person aspect of "let's you and me talk about these photos and the ways you have chosen to take and present them", so that client and therapist explore jointly rather than questioning the client directly. If the client is involved in the actual process of taking pictures, there is the additional benefit of observing the client in an activity which includes a number of interpersonal communications and relationships as they interact with other people.

Photos of the Client (By Others): How other poeple see us gives us an idea of how we present ourselves to the world; in dialogue with others (or with their photos of us) we gain valuable clues as to the identity we convey. This is often a safe channel for interpersonal feedback, as different interpretations of the same photo can be compared. It often occurs that clients do not really know how others perceive them, distort that perception, or are not consciously aware of the discrepancies. (8) If this has been the case, then it is possible that others have tried to relay this to the person. If this has been attempted verbally, it probably has most often been resisted, especially if the client is well-defended. Photographs taken by others allow external correlations of self-image, and are thus helpful in realizing the large range of different ways that different people see a person. It is very hard to dispute photo proof of how one is seen; it does no good to resist or rationalize when the direct perception in permanent form is held in your own hand! This doesn't have to be only negative, however, as successful skills or appearance improvements can also be documented.

Self Portraits: Self portraits most usually mean literally photographing oneself through a camera with either a timed release mechanism or long cable release, so that clients themselves control the power over how to pose, when to shoot, and whether to show the resulting photo. Looser definitions could include photos by others, as long as you still are in charge of the above decisions. For people who have varying degrees of emotional or interpersonal difficulties, it helps greatly to study oneself; photos have numerous advantages over mirrors!

As self portraits are probably the most powerful of all the PhotoTherapeutic techniques, in that people are most emotionally involved with/invested in their own image more so than any others, people usually therefore find them the most threatening or risky to confront and work with. As issues pertaining to self are usually the most central to therapy, bringing people literally face-to-face with themselves can have powerful results (and should not be used indiscriminately--if clients are not ready to face their own image, the results of confronting reality could be devastating). But, carefully guided while at perhaps their most vulnerable moments, clients can explore and confront, while documenting for themselves the changes that are occurring, or explore fantasies within a safe environment.

Video Therapy: Using video as a therapeutic tool adds another whole dimension of possibilities. The contribution of effects of motion, re-play, and direct reproduction of communication and behaviors without the filtering effect of any 'interpreter' whose description might be argued provides invaluable data for therapists (and clients). This field of techniques is packed with possibilities; there are three books on video therapy on its own! (9) Some of the most obvious generalizations that video work provides are those dealing with the extra value of gathering non-verbal information non-verbally, freeze/pause-action and repeat replays for second-chance viewing, and immediate impact of realizations made by oneself without outsiders' input, self feedback, as commitment for change thus comes more easily from within. As clients find viewing themselves 'live' in motion an un-arguable documentation of how they communicate and present themselves, they speed the therapy process by assuming more responsibility for their actions.

Video can be used in immediate replay, delayed replay, and/or long-range applications. Immediate uses are the most intense and emotionally charged. There is usually more honesty in a supportive non-judgmental environment. Often the tape serves as a support which enables a client to say something to others that they might not have been able to do without the 'proof' to use as an example. Delayed uses are more objective, less threatening, and less emotional because of the distancing over time. One advantage to delayed viewing is that one can get beyond the negative points focused upon immediately and see, upon several re-viewings, some of the more subtle and more positive aspects of people that often get overlooked in the heat of crisis. Another result of this 'pausing to catch the positives' is that family strengths, supports, and caring can be observed and discussed.

Long term replays are used most to demonstrate changes over long periods of time, where client growth/change has occurred and one wants indisputable affirmation of the progress. Additional uses abound: family and group work, therapist self-observation for skills improvement, training, documenting, creating expressive tapes as assignments, evaluation and prevention.

Darkroom Work: If there is access to a darkroom, additional techniques could be implemented. Learning the basic skills is surprisingly simple; most clients can turn out acceptable prints in a few lessons. The therapeutic goals can be as simple as having the client gain skills which lead to recognition by others or enhancement of self-esteem and confidence, to more complex or technical concepts. Basic goal-setting and realistic expectation-setting are clearly demonstrated in darkrooms, and clients quickly learn an appreciation of their own limits without having to be restricted by others' rules. Besides the learning of aesthetic concerns, skills for potential employment, or hobby development, the actual products they print are of further therapeutic benefit as they can manipulate and project through production photographs which then have value in the counseling process.

Further techniques are beyond the scope of this introductory paper; they can be accessed through searching available literature. The main emphasis throughout is for therapists to enlarge their own receptive abilities, and to train themselves to notice the potential significance of what they are hearing without over-interpreting it as it goes by in response to photographic stimuli. The basic vocabulary of these techniques is asking questions, concentrating not only on the direct answers to questions and probes, but also on how they are answered, what else 'goes by' as the responding is occurring, and making therapeutic use of it all. PhotoTherapy is more a way of thinking than a set of fixed techniques, a state of readiness to fully hear what passes by as comments are made, an ability to hear what one is listening to, for what it may tell about the person speaking if only you are open to receiving it.

Like so many holistic approaches and expressive therapies, PhotoTherapy suffers a bit from having to be taken apart for analysing its parts in any sequential or linear manner. Creative and effective therapists use these techniques in various interrelating combinations, intersections, and overlays--for example, all photographs are in some ways self-portraits; doing active album work requires projecting; family videos/movies are also albums, etc. Teaching and describing PhotoTherapy as in this paper, and in more intensive training programs offered, often forces the somewhat disjointed separation of what are really integrally related parts, and with a sense of loss, I might add, as the effect of the whole system of PhotoTherapy is so much more than just some combination of distinct step-by-step entities.

Photography is seductive, and both client and therapist must be cautious not to let the photography 'for itself' become the focus of the counseling interaction. (10) PhotoTherapy, as mentioned before, requires using both verbal and visual modes, and thus requires therapists who are trained to do both. Otherwise we are in danger of mis-information based on partial and incomplete knowledge/understanding of what PhotoTherapy is and has the potential to be. We must be careful not to develop a categorical system of analysis or semiotics that becomes too rigid: we don't want the person to photograph in order to fit some external expectations or definitions (expressed or implied); we don't want to see developed some third-person method of analyzing client responses by some prior assessment criteria--rather we want to serve people by responding to their freely chosen photography in ways which enhance sensitivities. Such photographs should be analysed rather than defined; we must be careful in establishing a methodology of photographic therapy not to establish a fixed language!

Thus there is a strong obligation for those doing training to assure understanding of the above considerations, to provide conceptual background and historical context as well as both descriptive and experiential information to those people-helpers being trained in these techniques. It should be assumed that these people's professional counseling skills (and ethics) are already fully developed, that the PhotoTherapy training is aimed toward providing additional adjunctive skills for these people to use in their own work. Formal training, even at the introductory level, is no light or brief matter, and both Dr. Krauss and myself have a strong commitment to ensuring that our training opportunities and classes grasp the entire implications of using these techniques with people, as well as sufficiently practice the skills involved. Although we both conduct training independently as well as jointly, there is a core content that is always consistently covered, so that our 'graduates' can be assured of a high standard and universally given program of instruction. We make no assumptions of always being the only two trainers around (in fact, it would be a relief to have more!), but we share a serious concern for commitment to rigorous standards of content and presentations so that participants are certain to come out of any training with close to the same experiences.

In closing, rather than attempting to present a lengthy (and probably boring) history, I will instead simply summarize the major highlights and contributions to provide readers with a 'grounding' and time context for PhotoTherapy's development, present active promoters, and a way to access these people and the available literature. As Marshal McLuhan so aptly put it, in the 'Electric Age', things do not happen linearly, but rather simultaneously! As mentioned before, the same happened in the development of PhotoTherapy--there are (or, at least, were) a dozen or so people who sincerely believe(d) that they truly invented this field and there are probably still more to come.

Photography itself was first made public by Louis Daguerre in 1839, and both Dr. Hugh Diamond in 1856 and Dr. Thomas Barnardo in 1870 were published with documentation of using the new field of photography to study physical change and self-image. Various individuals surely continued to do such work over the next century, but it wasn't until the past twenty years or so that speed gathered in terms of public recognition. By the late 1970's, the Electric Age had arrived in our field--numerous publications appeared, sometimes on the very same subject in the same month at different ends of the continent, or in my own personal experience, three authors appearing in the same journal issue on very similar topics who had never heard of one another!

The two contemporary figures who have had possibly the greatest influence on development of PhotoTherapy have been Minor White and Ralph Hattersley. Although neither of them is a therapist, their writings and teaching in the areas of expressive personal photography paved the way for the theories and practices which now form PhotoTherapy. White's major contribution to the therapeutic uses of photography was two-fold: the concept of the photo as an 'equivalent' of other aspects of an individual's life, and popularizing the concept that each image was in part a self-portrait. Hattersley contributed the groundbreaking book, Discover Yourself Through Photography, whose chapter headings sound like goals for a therapist's treatment plan. (11)

Akeret's book Photoanalysis in 1973 appealed to the public, though the professionals have several serious concerns with it. Kaslow, Friedman, and Entin began publishing at this time (mid-1970's), primarily regarding family work with photos and movies, as did Weiser in Canada's first publication in regards to photography as an agent of change, PhotoTherapy theory, practice, and her work primarily at that time with the deaf (1975). Other seminal authors in the field of theory were Stewart and Zakem (centered near Chicago) and Krauss (Ohio) who has added greatly to the literature several elegant documents regarding the nature and relationship of perception/meaning with photography and these applications in therapy. Walker and Fryrear are other early and regular authors--Walker producing many articles on projective uses (and interactive as well) of photos, and more recently work with Photo/Video Therapy with groups of elderly; Fryrear recording a variety of projects primarily using video in everything from juvenile delinquents' self-perceptions to successful behaviour rehearsal to interactive mask work.

Many other key authors have published regularly as well, most of whom also are serving as editors to the PhotoTherapy Quarterly Journal which formed originally in response to over 250 letters received by Zakem following his brief Newsline notice in a 1977 Psychology Today. The Quarterly now serves all the U. S. and eleven other countries, and welcomes submissions. There have been several comprehensive surveys of the literature (Loellbach, Fryrear, Krauss, Weiser), and an attempt at a continually updated full bibliography is kept by Krauss, Fryrear, and Weiser.

In addition to the Video books mentioned previously, there is now out our jointly written book, edited by Krauss and Fryrear, PhotoTherapy in Mental Health, available from Charles C. Thomas Press, and with it, hopefully (and finally!), credibility!

Workshops and conference presentations date from the mid-1970's; longitudinal projects at several hospitals and community centres began in the early '70's. Organized by Stewart and Zakem, the first International Photo-Therapy Symposium occurred in 1978 in Illinois (where all those 'inventors' met for the first time!). Since then there have been two published literature reviews, numerous articles, a PhotoProjects Kit, an assortment of chapters in various books, full books as well, and more than one reference bibliography of several hundred sources of articles and research project summaries. Krauss and Weiser have held dozens of training workshops and courses, including Krauss' major Kent State University gathering in 1981. Together they taught a week at Nathan Lyons' Visual Studies Workshop in Rochester, N. Y. (1982), and have scheduled several other joint sessions for San Francisco, Washington, D. C., and Houston, Texas, and others. This and several other training events have been given for various universities' graduate and/or undergraduate credit. Krauss' thesis was on developing a training model for teaching PhotoTherapy, and Weiser has been asked to prepare a regular course on it for the Department of Special Education of the University of British Columbia (budget permitting). Both trainers regularly serve as thesis advisors and readers; both have had the creative excitement of mentoring several apprentices in the past few years, some of whom are now contributing work and publications to the field.

Most of the network thus far mentioned present regularly at local/regional/national/international level conferences, individually, and also jointly for psychological, psychiatric, social work, child care counseling, teaching, rehabilitation, and other types of audiences. Most of the 'group' presented at the 1983 International Conference of Psychology and the Arts in Wales, and Fryrear presented at the AudioVisual Communication and Mental Health Conference (1983) in Helsinki. For several years, a 'flying squad' have gathered from all directions to present at the American Psychological Association's annual conferences, and 1983 marks the second appearance en masse at the International Visual Literacy Conference. IVLA started the public career of a relative newcomer, but elegant author, in applications of photography to inner worlds, Weaver, whose publication is soon to appear.

There is an International PhotoTherapy Association, as well, and it is sponsoring in Toronto in May of 1984 an International PhotoTherapy Symposium where practitioners and researchers worldwide will gather to present and network and share recent developments.

In early 1982, Weiser opened the PhotoTherapy Centre in Vancouver, whose three-fold purpose is to conduct research and write, to teach and train, and to carry on casework using these techniques where applicable. The Centre has become a major focus for communication in the field, a center for networking, literature accessing, student work, workshops, and ongoing classes. Weiser is also presently working on preparations for both an instructional text and a training tape. Later the same year, Krauss opened the Center for Visual Therapies in Ohio, Zakem the International PhotoTherapy Institute in Chicago, and Fryrear the Institute for Psychosocial Applications of Video and Photography at the University of Houston/Clear Lake City (Texas).

The field has thus been rapidly growing; if you were not along since the beginning, it is difficult to comprehensively grasp. This paper has tried, therefore, to give those relatively new to the field an introduction to what PhotoTherapy is (and why), the techniques involved, implications for training, and a bit of a feeling about how it all came to be. The following sheet lists data on how to find the key people mentioned, and whom to ask for what. All of the persons listed welcome and encourage communication and enquiries; whatever cannot be directly answered will be referred onward to the appropriate person. All of us believe very strongly in the power of photography to effect emotional responses and changes in people; we have witnessed it firsthand.

> "If you still have my photograph, then I am still safe in your heart"
>
> . . .client of Weiser

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# THE CREATIVE ELDERLY

by

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The question of human potential is all important. This paper will discuss a group of institutionalized elderly with an average age of 87 years, with varied impairments who are consciously involved in developing this potential. Through the use of photography, the members of the groups have been looking closely into their environment and themselves and are beginning to realize this potential. Using photography can be a means of self-expression and a beginning for dialogue with others in the group. The visual, being a universal, cuts across many barriers such as age, culture, and language. In discussing their images, the group members have taken risks and shared intimacy. The positive results have also been clearly visible in relationships outside of the group. Photography has helped individual members benefit in different ways; for example, separating from a loved one, or safely expressing pain and anguish. One lady, no longer outwardly beautiful, uses her camera to express her more lasting inner beauty.

This is a group project, put together by three people: Michael Gilbert, a professional photographer; Pat Cohen, a group worker; and myself, a psychiatrist and photographer. Michael and I are involved in this project on a voluntary basis, while Pat is a staff member of the Home for the Aged. The focus of this paper is on the therapeutic benefits of photography to the individuals within this group.

This group developed out of a personal interest shared by Michael and myself. We both were intrigued with using the camera as a vehicle to determine how the elderly view the world. It did not matter that some of our group had never used a camera before. It began as an activity group, not a therapeutic one. People came because they were curious, wanted to learn, or by a fluke of being in the wrong place at the right time. We started with 25 members and after 18 months, we had a core group of 15 (primarily Middle Eastern European Jews). As time passed, we recognized that in fact the group was inadvertently therapeutic which will be discussed within the case histories. Several questions developed as we pursued "A view of the world through the eyes of the elderly." Given a camera, what is the value to the elderly? Are the same things of value to them in old age as when they were young? What will they choose to photograph and what is worthwhile to them?

This is our first photography group. We plan to continue the group for at least an additional 18 months.

There is a strong element of fun and pleasure involved as well. Members look forward to the weekly meeting, to seeing the results of their endeavours, and to hearing the comments of their cohorts. Members of the group have proven to themselves that they can still learn entirely new things, and that even under such novel circumstances, creative energy is still there and others can appreciate and respect their endeavour. These people came together as a group of individuals who are curious about photography. They maintained their individuality while becoming a homogeneous group with a common interest and special goal. Learning to use the camera as their tool, they shared a new experience. A healthy competition developed--who would take "nicer" pictures. With the focus switched to "what is the picture saying?", the images changed. The challenge was picked up and they began to consciously use the images to speak for them. Members encouraged each other and began to accept each other as valued individuals. Through the images, their individuality became apparent to each other and to themselves.

Five members of the group have been selected to demonstrate the therapeutic value of photography.

1. Mrs. A. portrays a beautiful young woman in a broken old body. This lady, whose attitude is always positive, uses photography to express the joy she still finds in life. Photography, as a medium, reaffirms her view of the world and acts as a form of therapy. She said:

> I first came because it had something to do with art. My eyesight was a great drawback--but I came and was shown what I could do. I have a feeling that I'm doing something special. I do see images that I can take pictures of. I know what I want to do--it's not always possible--but I try. I've learned a lot from and about others by looking at their work. . .and I try to express myself--and it brings out an alertness--makes you think--gives incentive.
>
> I enjoy taking cheerful looking pictures because it makes others happy. I don't believe in things that are too sad. Even if they're sad sometimes, there's something there to capture, and it would bring forth something from the other person who would look at it.

2. "I'm an ugly, vicious, horrible woman," said Mrs. D. in response to a series of photos I took of her. "I was once a kindly, naive, trusting and good looking woman," she later admitted of an early 20's self portrait.

   In the beginning she said, "My major effort here . . . not to show who I really am." Yet, through her photographs, she eventually began to portray the many sides of aging, often photographing people 'deteriorated.' She now reveals herself as a very sensitive and caring individual. A person who, in fact, now clearly expresses a whole range of emotions and if the viewer really looks and engages these images, the humour, cynicism, sadness and the beauty of life will be revealed. For Mrs. D., the photograph has become an extension of her, a powerful key for expressing her personality. It allows her to express herself in a vivid way.

Here are some personal comments from Mrs. D.:

> It will be good for us to take pictures here. This place has been photographed from the outside in, but never from the inside out.
>
> I'm creative--when I have the camera, it gives me a new perspective to catch life. It is a new way of participating in life. I study my subject. Personally, I've discovered a new great art. The camera can be a storyteller. It has colour. It stirs the imagination. I find an awful lot can be said with the camera. It can help to bring attention to things that are meaningful--communicates what is important to you. It call attention to things that are both positive and negative. I'm in contact with flesh and blood.

3. Mr. R. is the youngest member of the photography group at 76. He is a dapper gentleman whose wife suffers from Alzheimer's disease. Photography has acted as an aid in helping him in separating from his wife, 'the jewel of his life', as she had to be moved out of their shared accommodation to a special care unit. His pictures are dominated with her image--recording her while she was 'healthy.' This process of continually photographing her helped him confront his impending loss--the guilt, the sadness, and the anger. He was burdened constantly being with her. Discussing his photographs helped him to identify and to express these feelings. At the same time, it allowed him to stand back and be objective. He has never taken a picture of her since her transferral from their room to another floor in the residence. He now appears vibrant, active, and involved.

He is very proud of being a photographer and feels that he is very professional which gives him a sense of importance.

Here are some memorable quotes by Mr. R.:

> This program brought back an old desire for photography. My greatest interest is the family--grandchildren from birth to marriage. I'm happy about the photos of me and my wife. It tells a lot about my life--I'll look back later in life. It gives you the feeling that you have existed and still exist.
>
> This experience of photography gave me a new outlook. An experience which I have never had before. I didn't

> think it could be possible for me to do photography in a way that we are doing it at our age--to bring something out that would take a prize of any kind. It's very surprising for me.

On an outing to Kensington Market, which he last visited 16 years ago, he said:

> I'm searching for a memory. I'm looking, but I can't see. I'm searching for the balcony where my 2 year-old nephew sat on my knee, it's not there anymore. Tears came. It hurts that I can't even recognize the home where I was married in and made my living. Even though it still hurts, I wanted to see what became of it.

4. Quiet, withdrawn with flat affect and glazed expression, Mrs. W. looked depressed and apparently uninvolved. With the support of the group, this very passive 82 year-old transformed into an articulate, smiling, animated, and involved photographer. Originally a 'loner', she now helps others. She has become more assertive and adventurous. The camera gave her license to approach and to interact with others.

Initially, she only wanted to photograph scenery, not people. Six months later, she was saying:

> It's very important for us to get together and see what other people are doing and can do--I try, I'm learning.
>
> It gives you satisfaction to know that you belong to something that is important to others as well as yourself. It gives me a real interest--I know when I get up in the morning--today I'm going to photography. You see the pictures, we get a kick out of what we've accomplished.
>
> I find that photography gives me a great interest--even now when I come across an article about photography I keep reading it. I just read an article in the Post. It gives me something to think about and to go on. It brightens your attitude to life, you see that you've accomplished something. This is mine.
>
> If we don't have an exhibition, our work is wasted--it's very important to show it--then something important has been done with this programme.

5. Mr. T. was almost a great photographer when he became confined to a wheel chair due to a stroke. He is the only member of the group to reside in the hospital wing of the home. After his stroke, he gave up the most important thing in his life, his photography. He has been very isolated in the hospital

and came to the group with a willingness to share his knowledge. His words express most eloquently the meaning of photography for him:

> Photography is important for me--an important ingredient to my existence. It establishes a frame of reference for all of us. It is the cement which keeps the group together. It has allowed me to meet people and to establish a sense of communication.
>
> The medium is the message--it applies here--we have a medium. We are a group who, by circumstances, have been removed from active participation in society. Through the means of the camera, we have been restored to a form of involvement with society. The camera is the instrument by which we can record our impressions of the world around us. It has given us a community of interest and also a renewed sense of comradeship. It also has given us a more optimistic view of our potential. It has fulfilled the primary function of communicating.
>
> Rather than verbalizing, we're picturizing.
>
> You see something beautiful and you want to share it with somebody, but the image that you see in your mind's eye, you have difficulty finding the words to really describe it--but if you've taken a picture--you can share it.
>
> It motivates people to think creatively. It motivates people to look upon the camera as a creative instrument. It has restored my interest in photography. A physical handicap has the tendency to make one forget. The experience of photography now for me isn't any different from what the situation was before. The only thing is the danger one encounters when one becomes physically handicapped that it may in a sense remove them from the mode of life in which they had been engaged. One has a tendency to lose the original motivation.
>
> Photography is therapeutic in the sense that one gets a feeling of accomplishment. One has been involved in a process and by having the show one has the concrete evidence of the fact that they have done something worthwhile and you have also been able to share it with other people. Doesn't that give you a good feeling, that you have done something and shared it with other people--and the other people have appreciated it?

Although this paper focuses on the elderly, the principles and process are applicable to any group. It can be a therapeutic medium for any type of group--adolescent, retarded, or learning disabled.

The main therapeutic benefit of this programme has been the enhancement of self-esteem. Each individual has confronted a different personal problem--a negative or handicapped self-image, shy or introverted personality, loss of a loved one, or the maintenance of a positive outlook. Through the process of photography they continue to enhance the quality of their lives, with the resultant development of potential and self-esteem. By seeing the possibilities open to them, they have been motivated to develop this recently acquired skill to new heights. They recently exhibited in the City of Toronto's annual outdoor Art Exhibition and won second prize (student division). They are now working towards an art gallery exhibition for which they will photograph, edit, and attend.

The group feels it is important to make a public statement. They are implicitly saying: don't forget us because we are old. We continue to have social worth, self worth, and our dignity most of all.

> We are gifted and participate and have ability. We are capable and are asserting ourselves as people.

# A PHOTOTHERAPY PROJECT

by

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The purpose of this pilot project has been to explore uses of still photographs with clients in a partial hospitalization program. Although much work has been done with video tape, there has been little systematic exploration of the application of still photography to an outpatient clinical population. It was hoped that the use of still photographs might enhance diet awareness and self-esteem as well as effect positive changes in behavior, thinking, and perception. The partial hospitalization program serves clients who do not need psychiatric hospitalization yet cannot function either fully or independently in the community without the support and services provided by this protective environment. The unit staff works as a team and includes a psychiatrist, a nurse, a psychologist, and three social workers, who create a program of social activities, individual and group psychotherapy. We have utilized still photographs in all three treatment areas.

The clients in this program offer a special challenge. They traditionally are viewed as a difficult group to work with psychotherapeutically because of the generally long-term nature of their problems, a history of multiple hospitalizations, and perceived low motivation for change. From a census of approximately 70 clients, the unit serves between 35 to 40 five days a week. Although the program is used by males and females of various national origins ranging from age 19 through 82, the average client could be described as a 55 year old divorced female, with a 10th grade education, four hospitalizations, a diagnosis of schizophrenia, who is being medicated to maintain stability. For the most part, these clients have low insight and a poor prognosis.

In working with these clients, difficulties often arise in encouraging them to exhibit less dependent behavior, and in motivating them to behave and think in more appropriate and functional ways. We have sought to use photography as an innovative adjunct to this process and have attempted in a preliminary way to answer the question, "In what ways might still photographs be used in a partial hospitalization program to aid in the change of client behavior, thinking, attitudes, and perceptual processes?" We have, therefore, used photographs in a fairly wide variety of applications in both the socialization and psychotherapeutic components of the program. Preliminary results from both clients and staff indicate that these techniques are potent ways to deal with this population. There is also an implicit belief that the kinds of techniques which prove useful with this population can be readily transferred to more highly functioning client populations.

There are a number of characteristics of photographs which make them efficacious with this population. Looking at photographs is a socially acceptable activity. Clients like to see pictures of themselves, pictures they have taken, or photographs made by others that interest them. The discussion of the content of these photographs is novel and perceived as a low risk situation which facilitates the building of rapport between the therapist and client. The concrete nature of the image itself allows a therapist to gather information which the client may deny or be unaware of. Conversely, the symbolic nature of photographs allows a therapist to gather information, to see and hear client concerns in a more clear and less defended way. As visual images, photographs, like dreams, access right hemispherical activity, and photographic non-linear information is always given a context by the client. In this way all photographs are similar to other projective devices. Additionally, the visual nature of these stimuli makes them particularly useful to a population which is not particularly verbal in nature. By allowing them to look at and respond to photographs, clients have a content and context to talk about.

As stated earlier, we use photographs in the social as well as psychotherapeutic components of our program. We use Polaroid photographs as diagnostic aids in our initial interviews with clients. In addition to the background information such interviews provide, these instant Polaroid photographs tap into another dimension of a client's orientation and perception. Clients are asked to sign permission slips to be photographed and then are requested to choose where they would like to be photographed. This often gives an indication of how active they are able to be in the therapeutic process. Subsequently, we look at the photograph together. Clients are asked to answer a number of questions concerning the image such as: "Who is this person?", "What do you like in this photograph?", "Is there something you don't like about the photograph?", "If we take another picture now how would you change it?", "If we took another picture in six months what would we see that would be different?", "How would you title this picture?" These kinds of questions allow the therapist to ascertain the clients' present levels of awareness, ability and willingness to self-disclose, and their sense of the future. The clients' decision regarding how they choose to position themselves can also be significant and correlate with their levels of physical energy and how active they are willing to be at this time. Many times, for example, the title of the photograph will focus in on a client's area of concern with surprising clarity. One client, with low self-esteem and little perceived ability to interact in social situations, titled his picture "Stage Fright." A schizophrenic client with an Elmer Gantry-type father chose to be photographed by a window in such a way that the resultant shadows made him appear to be menacing. He titled this image "The Alcoholic." Subsequent work with this client focused on religious preoccupation with good, evil, alcohol and drug problems. A client who was resistant to the therapy chose to look out the window and away from the camera.

We have also used photographs in conjunction with an art project to work with client self-concept. We outlined the front view of our clients on a large sheet of paper in a hallway and asked them to color the figure. When this was done, we made a photograph of the client beside the drawn "self portrait." We then discussed the differences between them as expressed in the drawing and how they appeared in the photo. The drawings all contained pertinent information regarding the clients' concerns and would have been useful by themselves. The addition of the actual person's image next to the drawing made this a more powerful tool because differences between the perceived and the real were readily available for viewing and discussion.

Family albums have also been used to gather data about clients for use in diagnoses and treatment as we see families relating to each other (and the photographer) over time. We see clients interacting with their families and others, demonstrating family and social rules. These albums show us how clients present themselves to the world (pose), significant to others in their lives, and events with symbolic significance. We have also noted themes of alcoholism, passive-aggressive behavior, sexual dysfunction, and marital conflicts in clients' family albums.

We also have a unit "family album," and pictures of clients and staff are made on special occasions. Every year we go out as a group for a Thanksgiving meal. It has become a tradition to photograph each table of clients and staff. Originally, the photographs were made by staff only, but for the last two years a number of clients have volunteered to take the photographs. We believe they are able to do this because of the previous successful and enjoyable contact with instant cameras on the unit. As always, these images draw much attention and comment from clients.

Photographs are also used with client groups. For example, a useful exercise has been to ask the group as a whole to demonstrate a particular emotional state and then photograph the group. As we look at the photos, we pursue the various ways people express their emotions (or do not express their emotions) and the messages they give and the messages they wish to give. They get feedback from the therapist and from the group regarding the effectiveness in varying their emotional responses. We ask clients to demonstrate emotions such as being angry, fearful, happy, silly, serious, normal, bored, tired, etc. If they are seen to be unable to exhibit much change, we show them pictures of clients whose affect is more mobile and encourage them to model the other clients' expressions. This provides permission and encouragement to try new behavior. Like most other phototherapy techniques, this gives clients immediate visual and verbal feedback regarding their behavior.

Sometimes a phototherapy technique can be useful with a particular group member. The use of photographs with one client was useful in mediating his polarities as a group member. Another client in the group had stated that "Bob" only sat in two positions--described as either "laid-back" almost horizontally in his chair or poised so that he looked like he was about to pounce. This perception was shared by other group members. By creating photographs which showed him in these positions, he became aware of how he appeared to others. We then asked him to create a physical position which incorporated aspects of the two poles of his behavior that allow him to be both attentive and relaxed in the group. He was able to do this and to in fact integrate this new behavior as he contemplated the series of photos we had made only minutes before.

We have found that still photographs are useful to affect changes in body image. A number of clients in our program are overweight and have requested to be in a diet group. As part of this process, we make instant photographs of each group member, ask them to attach it to a sheet where they write their name, the date, their weight, and fill in three "I...." sentences. We make "before" and "after" photographs as well as monthly progress photographs. In this way the group members are confronted with their physical representation. Recently in an effort to make these images more impactful, we have started shooting in color, and in addition to the full front view, take a side and back view. According to initial client reports, these photographs, because of their different points of view, create an even more powerful image of what these clients look like now. These images, unlike any mirror image, allow clients to see themselves as others see them. It is quite hard for most of the clients to diet, because food consumption is one of their few pleasures. We are hoping that putting these images on their refrigerators will function as aversive stimuli and will influence them to decrease their eating. The photographs, of course, are only one component of the diet program, but we feel that their concrete visual evidence makes the denial of over-eating harder to accept.

We have also used photographs as a stimulus for interaction in the socialization activities of the unit. We have done this in several ways. One way we did this was simply to place an unmounted 8 x 10 inch black and white photograph on office doors across the hall from the socialization room. Clients would comment to therapists and each other about the pictures and sometimes discussions as to how the pictures were made, where they were taken, and more general questions regarding traditional black and white photography would emerge. Upon occasion, we would put up a photograph which included the clients themselves. They would be pleased to see themselves and others they knew, and, in addition to the above discussions, clients would call other clients over and show them where they were in the pictures.

Because most clients know each other by sight, but few know many other clients' names, we created an exercise which would increase their self-esteem and help them to learn more about other clients at the same time. For this exercise, we used two Polaroid SX-70 cameras, one on a tripod with a fixed background, and a hand-held camera that could be used to make portraits in which the photographers had to take more control of point of view, distance to subject, background, and how the subject would be portrayed. In this way, all clients could have successful experiences as subjects and photographers as each one chose how they wished to make a portrait and also how they wished to be portrayed as the subject. Each client was able to successfully make a photograph of another client, and there was good interaction between clients as they looked at and commented on the photos. We then gathered up all the photographs and asked clients to select a photo of another client they did not know very well. They were asked to write a number of characteristics which would identify the client to the group. One by one, clients read off their descriptions of other clients and had the rest of the group make comments about who the person might be. In this way, all clients were identified and the group as a whole got to know each other better.

We have seen that photographs when applied in innovative and appropriate ways can be powerful adjuncts in changing client behavior, thinking, and perception. We have used photographs to entertain and confront, to function as symbols, and to provide concrete information. When we have used these materials in social and therapeutic activities, clients have been helped to see themselves and their world more wholly. We are excited by this work and the potential it shows for helping clients.